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# Application Profile

**Application Number:** R372A05128

**Competition:** 84.372A05 **Date Entered:** 6/30/2005

## Organization Information

**Organization Name:** Minnesota Department of Education

**Organization Unit:** Division of Information Technologies

**Organization Address:** 1500 Highway 36 West

Roseville, MN 55113 **Country:** United States of America

## Project Director Name and Information

**PD Name:** Ms. Cathy R Wagner

**PD Address:** 1500 Highway 36 West

Roseville, MN 55113 **PI Country:** United States of America

**PD Phone:** 651-582-8688 **PD Fax:** 651-582-8731 **PD E-mail:** cathy.wagner@state.mn.us

## Collaboration Organization(s)

| Organization Name | Organization Type | State | Country | Key Personnel | Role on Project |
|---|---|---|---|---|---|
| Minnesota Department of Education | State | MN | United States of America | Rhombs, Craig | Project manager - coordinate all daily activities across development teams |
| | | | | Wagner, Cathy | Minnesota Project Director Coordinate cross state activities |
| | | | | Paulson, John | Project Co-director- Technical Manager |
| Wisconsin Center for Educational Research, University of Wisconsin Madison | Public College or University | WI | United States of America | Meyer, Robert | PI -coordinate collaborative cross state research |
| | | | | Thorn, Christopher | C0-PI technology lead and coordinate collaborative cross-state research on systems and tools |
| Michigan Department of Education | State | MI | United States of America | Ropp, Margaret | Project Director - Director CEPI |
| | | | | Pung, Linda | Co-director on project- Client Services Director CEPI |
| | | | | Roeber, Edward | Sr. Executive Director, Office of Assessment and Accountabilty |
| | | | | Galloway, MaryAlice | Special Assistant to the Chief Academic Officer |
| | | | | Grover, mark | Educational Consultant CEPI |

| | | | | |
|---|---|---|---|---|
| Wisconsin Department of Public Instruction | State | United States of America | Wilmot, Brian | Project Director- coordinate cross state activities |
| | | | Koenig, Phillip | Technical services director, coordinate develoment of data warehouse |
| | | | Carl, Bradley | statistica and accountability manager coordinate end-use data applications |

**Application Title**

Longitidunal Data Systems to Support Data-Driven Decision-Making

**State Identifier**

**Period of Performance** **Project Begin Date:** 11/01/2005 **Project End Date:** 10/31/2007

**Abstract**

1. The title of the project: Longitudinal Data Systems to Support Data-Driven Decision-Making: A Proposal from Minnesota

2. The RFA goal under which the applicant is applying: Design, develop, and implement statewide longitudinal data systems.

3. The potential contribution the proposed project will make to the solution of an education problem: Many states, including our own, are ill-equipped to manage and effectively use the data states are now required to collect as a result of NCLB requirements and other state and federal policy initiatives. The goal of this project is to create a multi-state longitudinal data system that will enable educational stakeholders to conduct value-added and other diagnostic and policy-relevant evaluation research and engage in data-driven decision-making, with the ultimate goal to improving student achievement for all students and all schools. In order to achieve these goals, our project is structured so that all design decisions will be fully informed by a thorough understanding of end-use requirements and, more generally, by the needs of all educational stakeholders: parents and students; teachers; school, district, and state leaders and program staff; and policy makers. One of the major benefits of reaching out to stakeholders is that we expect that the longitudinal data system developed during the course of this project will in some sense be owned by these stakeholders. One of the distinctive aspects of our proposal is that it reflects a genuine collaboration among three states and the Wisconsin Center for Education Research. Working together will permit each state to share responsibility for at least fifty percent of all project tasks, thereby in effect more than doubling the impact of the resources allocated to each state. Moreover, by structuring work products so that they can be shared across the Tri-State Partnership, we expect that these products will be of value to states that are not explicitly part of our collaboration. Project results and products, including overview papers that describe the concepts and strategies used in this project, will also be disseminated via conferences and workshops.

4. The population(s) from which the participants of the study(ies) will be sampled (age groups, race/ethnicity, SES): The longitudinal data system developed by this project will include data on all students enrolled in PK-12 education. Collaborating with state partners in the PK-16+ Initiative, we expect to extend the longitudinal data system to include students enrolled in higher education.

5. The proposed research method(s): The project has been divided up into distinct task areas: data analysis and research requirements, data access, data dictionary, data warehouse, and

**Human Subjects:** No **Exempt from Regulations:** No **Exemption #:** **Assurance #:**

**Exempt Narrative:**

**Non-Exempt Narrative:**

**Estimated Funding**

| | | | | | |
|---|---|---|---|---|---|
| **Federal:** | $3,851,481.00 | **Local:** | $0.00 | | |
| **Applicant:** | $0.00 | **Other:** | $0.00 | **Total:** | (b)(4) |
| **State:** | (b)(4) | **Program Income:** | $0.00 | | |

**Federal Budget**

| Budget Categories | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|---|---|---|---|---|---|
| 1. Personnel | $209,674.00 | $357,679.00 | $444,015.00 | $222,008.00 | $0.00 | $1,233,376.00 |
| 2. Fringe Benefits | $69,891.00 | $119,226.00 | $148,005.00 | $74,003.00 | $0.00 | $411,125.00 |
| 3. Travel | $14,750.00 | $14,750.00 | $14,750.00 | $14,750.00 | $0.00 | $59,000.00 |
| 4. Equipment | $626,500.00 | $0.00 | $268,500.00 | $0.00 | $0.00 | $895,000.00 |
| 5. Supplies | $2,000.00 | $6,000.00 | $6,000.00 | $4,000.00 | $0.00 | $18,000.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Contractual | $66,667.00 | $266,667.00 | $266,667.00 | $200,000.00 | $0.00 | $800,001.00 |
| 7. Construction | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 8. Other | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 9. Total Direct Costs | $989,482.00 | $764,322.00 | $1,147,937.00 | $514,761.00 | $0.00 | $3,416,502.00 |
| 10. Indirect Costs | $118,737.00 | $91,719.00 | $137,752.00 | $61,771.00 | $0.00 | $409,979.00 |
| 11. Training Stipends | $5,000.00 | $15,000.00 | $2,500.00 | $2,500.00 | $0.00 | $25,000.00 |
| 12. Total Costs | $1,113,219.00 | $871,041.00 | $1,288,189.00 | $579,032.00 | $0.00 | $3,851,481.00 |

## Non-Federal Budget

| Budget Categories | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|---|---|---|---|---|---|
| 1. Personnel | | | | | | |
| 2. Fringe Benefits | | | | | | |
| 3. Travel | | | | | | |
| 4. Equipment | | | | | | |
| 5. Supplies | | | | | | |
| 6. Contractual | | | | | | |
| 7. Construction | | | | | | |
| 8. Other | | | | | | |
| 9. Total Direct Costs | | | | | | |
| 10. Indirect Costs | | | | | | |
| 11. Training Stipends | | | | | | |
| 12. Total Costs | | | | | | |

## Application Details

| | | | | | |
|---|---|---|---|---|---|
| D-U-N-S Number: | (b)(2) | T-I-N: | 416007162 | Duration (years): | 3 |
| Any Federal Debt: | No | Specify: | | | |
| Type of Applicant: | State | If Other, Specify: | | | |

## Authorized Representative Information

| AR Name | AR Address | AR Phone | AR Fax | AR E-mail | Primary: |
|---|---|---|---|---|---|
| Ms. Cathy Wagner | 1500 Highway 36 West<br>Roseville, MN 55113<br>United States of America | 651-582-8688 | 651-582-8731 | cathy.wagner@state.mn.us | Yes |
| Mr. John Paulson | 1500 Highway 36 West<br>Roseville, MN 55113<br>United States of America | 651--582-8541 | 651-582-8731 | john.paulson@state.mn.us | No |



**June 30, 2005**

# Longitudinal Data Systems to Support Data-Driven Decision-Making: A Proposal from Minnesota

**PIs: Cathy Wagner and Rob Meyer**

A proposal to the Institute of Education Sciences, National Center for Education Statistics, U.S. Department of Education

**Minnesota Department of Education &**
**Wisconsin Center for Education Research**
**School of Education University of Wisconsin–Madison**

**Table of Contents**

## Introduction

The No Child Left Behind (NCLB) act requires states to publish annual achievement, attendance and graduation data for students in grades three thorough eight and high school, along with a full set of demographic information. Schools and districts are additionally required to use this data to inform continuous improvement decisions at the local level. The good news is: federal policy has resulted in the creation of truly robust state-level data sets for the first time. The bad news is: many states, including our own, are ill-equipped to manage the data and facilitate effective decision-making for school improvement.

We are pleased to submit a proposal in partnership with Michigan, Wisconsin and the Wisconsin Center for Education Research (WCER) to build a comprehensive multi-state longitudinal data system (LDS). We have taken the goals of this grant program very seriously: "to build data system capacity to: generate and use accurate and timely data to meet Federal, State, and local reporting requirements; allow for value-added and other diagnostic and policy-relevant research; engage in data-driven decision-making; and improve student achievement." In order to achieve these goals, our project is structured so that all design decisions will be fully informed by a thorough understanding of these end-use requirements and, more generally, by the needs of all educational stakeholders: parents and students; teachers; school, district, and state leaders and program staff; and policy makers. One of the major benefits of reaching out to stakeholders is that we expect that the longitudinal data system developed during the course of this project will in some sense by owned by these stakeholders. A sense of ownership and shared purpose is important if we expect stakeholders to fully support the operational requirements of the longitudinal data system and to "buy in" to the strategy of using data to drive student achievement.

One of the distinctive aspects of our proposal is that it reflects a genuine collaboration among three states and the Wisconsin Center for Education Research – hereafter referred to as the tri-state partnership.[1] We recognized early on in the process that a collaborative approach offered many key advantages. First, working together will permit each state to share responsibility for at least fifty percent of all project tasks, thereby in effect more than doubling the impact of the resources allocated to each state. Moreover, by structuring work products so that they can be shared across the tri-state partnership, we expect that these products will be of value to states that are not explicitly part of our collaboration.[2] Second, as we discovered, each state has unique pockets of expertise that we will be able to exploit to produce the best possible LDS products. We suspect that no state possesses, or has access to, the complete spectrum of expertise required for this project. Third, we recognized that it would be productive to partner with a national research center such as the WCER that is experienced in large scale data analysis and data-driven instructional systems. WCER is a particularly appropriate collaborator for the tri-state partnership because of its extensive track record working with educators and policy makers in Michigan, Minnesota, and Wisconsin. Fourth, we quickly realized that working as state collaborators will force us to confront the challenges of building and adopting data dictionary and warehouse specifications that are universally shared. Finally, by approaching our

[1] Table 1, discussed later in the proposal, lists cross-state collaboration and task responsibilities by state.

[2] As discussed later in the proposal, we plan to disseminate these products via a project website and via conferences and workshops targeted at educators, educational researchers, and the informational technology community.

work in a fully collaborative manner, we hope to contribute to the process of building a network of districts and states that shares a common interest in data-driven decision-making.[3]

Another major strength of our project is that it is not a stand-alone venture. Rather, it is a project that builds on the distributed expertise of organizations involved in supporting data-analytic activities in the tri-state area and throughout the nation, including:

- Large urban districts, such as Minneapolis and Milwaukee, pioneers in the use of value-added analysis
- State regional organizations, such as the Cooperative Educational Service Agencies (CESAs) in Wisconsin, agencies that provide assistance to school districts
- National technical and data standards boards
- Software vendors that produce applications to support data storage and analysis
- States that have developed exemplary solutions to collecting, storing, and analyzing educational data
- Postsecondary institutions (also involved in building data warehouses)

We discuss how we draw on expertise from these organizations later in the proposal. Although the primary focus of this project is on developing warehouse capacity at the PK-12 level, we have solicited the support of higher education institutions in our states and are pleased that we will pursue strategies to link PK-12 and higher education data, thereby yielding data warehouses that span pre-kindergarten through college and graduate school.

One important implication of the fact that some districts and organizations may support data-analytic activities above and beyond those sponsored by the state is that it is helpful to conceptualize state data warehouses as being only one part of a larger warehouse structure that also includes regional and district warehouses (although not all districts may be represented at all three levels). Rural districts, in particular, may rely entirely on a state data warehouse, whereas large districts may support data warehouses that contain data above and beyond the data contained in a state data warehouse.[4] This implies that states need to coordinate with districts in the design of data collection strategies so as to minimize the burden of data collection. Secondly, as discussed extensively later in the proposal, it is essential to design data warehouse structures so that data can freely be exchanged between schools and districts.

One of the organizing principles for this project is that we plan to break down tasks into discrete parts that can be designed and implemented in phases. This approach is required because we have end-use applications that we are eager to support, and because incremental implementation of our warehouse design is the best way to build local support for the overall project. The project timeline (Appendix A) provides details on the phased implementation of three types of activities: shared cross-state activities (such as development and adoption of data dictionary specifications), state-specific implementation of products (such as the data portal to support data access by various stakeholders), and end-use applications (such piloting a state value-added system).

We believe that this project will provide a major impetus to transforming the state educational agencies in Michigan, Minnesota, and Wisconsin and, in particular, the ways in which state agencies interact with and support schools and districts, cooperate amongst themselves and with institutions of higher education, and operate internally. One immediate

[3] Several districts, including Minneapolis, Milwaukee, Mounds View (Minnesota), and Cleveland are currently working with WCER to develop a self-help network to support value-added analysis and other data-analytic activities.

[4] See Figure 3 in Appendix B for a schematic picture of alternative state, regional, and district warehouse configurations.

benefit of writing this proposal is that state department divisions that have not previously interacted are now talking. One common thread among the three states involved in our project is a collective willingness to leap-frog to a different level, one in which data analytic activities play a key role in decision making at all levels of the educational system.

In the next section of the proposal we discuss the need for this project from the standpoint of Minnesota. Subsequent sections present the details of the project organized into five major task areas: data analysis and research requirements, data access, data dictionary, data warehouse, and secure data transport. In recognition of the fact that this project involves substantial cross-state collaboration, significant parts of the proposal were written collaboratively and are identical in the three state proposals. The project narrative also incorporates examples from all three states. At the end of each section we include short sections that comment on issues unique to each state

**Need for Project**

In 2005 the CELT Corporation in conjunction with the Council of Chief State School Officers (CCSSO) conducted a comprehensive review of Minnesota's information infrastructure and ability to meet the new federal data requirements. They concluded that while historically Minnesota has been a leader in education, over the last decade a combination of factors including budget deficits and aging technology infrastructure have resulted in weakened and fragmented information technologies services that make it impossible for the state to provide adequate decision support tools for districts to effectively implement new NCLB requirements. Additionally Minnesota is not able to provide researchers with the quality of data needed to conduct longitudinal value-added analysis or facilitate educational decision-making in the new era of accountability. The key findings from the CELT review are outlined below:

*Infrastructure*

- Technology applications reside on mainframes, are built in a variety of languages and platforms, are not documented and in many cases are obsolete.
- Minnesota's data lacks a common architectural structure. There is no unified collection or retention system. Existing systems are very silo driven. There is a fundamental need to develop a focused strategy and architecture for all state data systems.
- Valid longitudinal data analysis is not possible due to the lack of a unified student identification system with the capability for real time validation of student identifiers. Because districts are allowed to enter unvalidated student identifiers into the system without a provision for data cleansing across years the data is not suitable for comprehensive research.
- With a wide range of systems and databases to support along with the need to upgrade basic architecture, define and enforce clear data standards additional IT staff assistance is needed. Many of the existing staff lacks the skills to architect and implement effective solutions.

*Decision Support Tools*

- The Department is not currently able to provide sufficient technology tools to promote the use of student performance data and data driven decision-making due to aging and rigid technology systems.
- The Department does not have an adequate password security system. Data systems are not sufficiently sophisticated to permit school district personnel to access student level with out violating confidentiality requirements. Classroom teachers are unable to access longitudinal profiles of students in their classrooms to identify educational practices that would be effective in raising achievement of their students.

- Minnesota is not able to provide researchers adequate access to linked data sets due to the lack of a suitable portal and disorganized underlying data structures. There is currently no ability to connect students to specific teachers. Without suitably structured data it is not possible conduct analysis and research necessary to evaluate the effectiveness of programs and instructional practices.
- There is no systematic provision for the collection, documentation or publication of contextual variables that impact student achievement across all schools in the state.

Based on these key findings Minnesota has identified three strategic goals that will focus the restructuring of the information technologies services over the next five years.
*1) Data Portal* Minnesota will design an instructional portal to provide integrated access to decision support tools for data-driven decision making. This portal will include password protected security assess for a variety of users including parents, educators and researchers while maintaining appropriate confidentiality of data sets. Data access policies will be developed to permit standardized role definitions. User needs will be researched to identify the most useful reports and data analysis options for each user group.
*2) Data Warehouse* Data accessed through this portal will be stored in a warehouse based on an enterprise wide architectural design and will eventually house all of the educational data at the state. The warehouse design will include an enterprise level data dictionary, automated editing procedures and vendor neutral open-architecture standards to support interoperability frameworks. The use of national interoperability standards will facilitate data exchanges and transfer among districts within Minnesota, from districts to the state and among partner states.
*3) Linked Data Sets* The data warehouse will have the capacity to include both traditional empirical data sets to support quantitative research and additional survey data to support qualitative research. Student level data will be linked to unique identifiers that can be verified and authenticated at the district level to promote accuracy in longitudinal data analysis. Through this project we will research and begin implementation of policies and procedures necessary to link student information to teachers and subjects taught. The addition of qualitative data sets will permit educators and researchers to further explore contextual educational practices and study their impact on student achievement and reducing gaps among different subgroups.

While MDE has made some progress toward these goals through a recent planning grant and several related internal initiatives the need for fundamental structural changes remains. These changes will require significant additional funding and unflagging support from senior leaders in order to achieve the level of data-based decision support services that are increasingly required. Obtaining additional state funds is unlikely given the current fiscal climate. The Longitudinal Data Systems grant is a unique opportunity for Minnesota to invest in data architecture and data warehousing, and invest the political capital on needed internal restructuring necessary to support agency-wide integration.

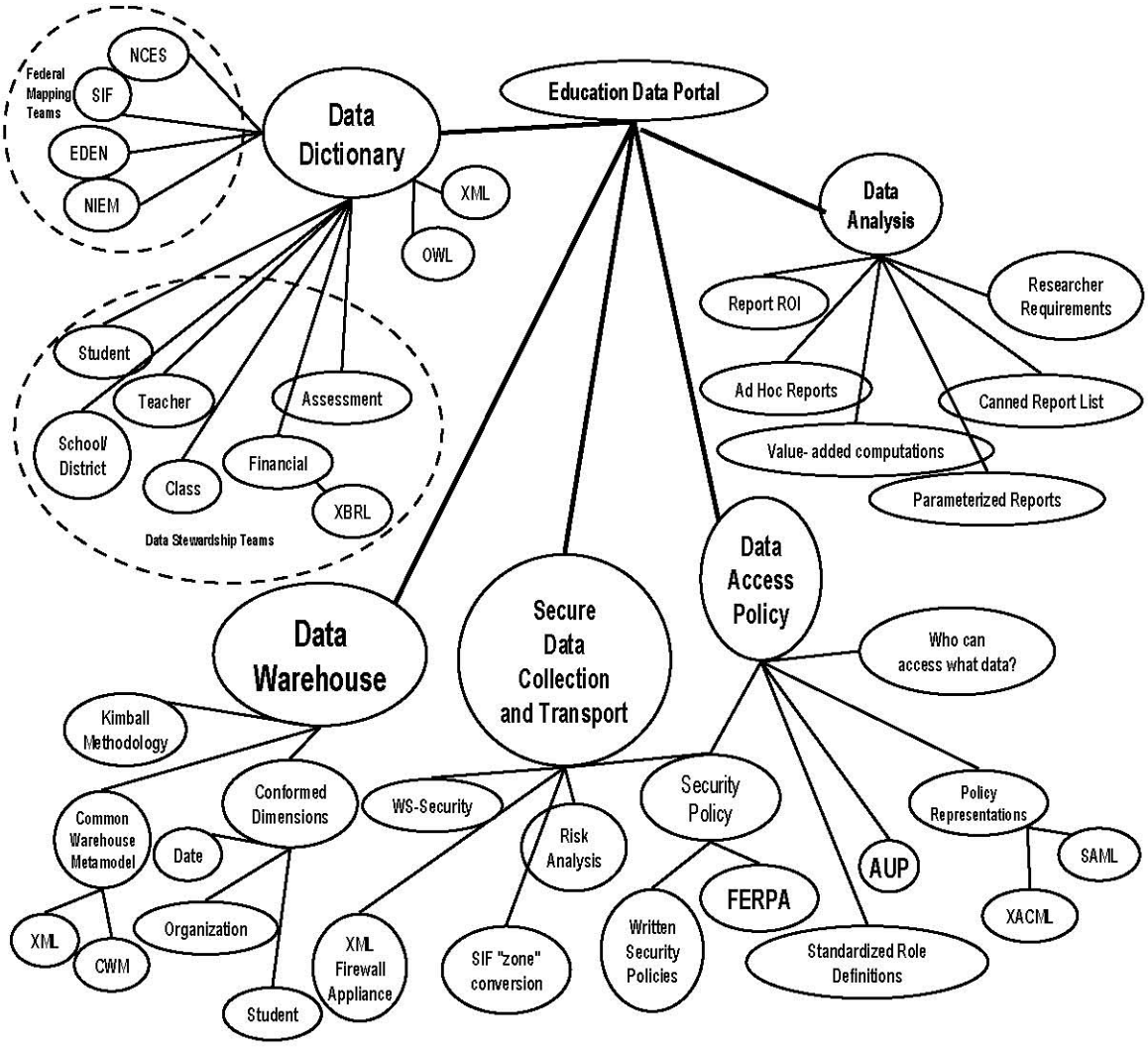
## Project Partners and Group Design Plan

As states struggle to meet the challenges of developing useful decision support tools, they all face similar obstacles. They must address state policy constraints, technical obstacles, and diverse user needs. The work of this project will be enhanced through a multi-state partnership among the Michigan Department of Education (MDE), Michigan's Center for Educational Performance and Information (CEPI), the Minnesota Department of Education (MDE) and the Wisconsin Department of Public Instruction (DPI). This partnership will foster the design of common solutions, leverage resources, and increase the capacity to exchange data across states

in the hopes of creating more powerful and robust research tools. Each state is prepared to take the lead role in different components, share design solutions and development requirements with partner states to accelerate the implementation process for all.

This multi-state partnership will also include the WCER in the School of Education at the University of Wisconsin in Madison. WCER will assist in identifying best practices in data use policies, researcher and educator user requirements, and decision support needs in order to optimize the architectural design of the emerging data portals, warehouses, and linked data sets in each of the partner states. WCER will also take the lead in facilitating effective collaboration across states, including the development and implementation of a plan for national dissemination of design documents and results. This plan includes the development of a project web site, presentation at NCES, CCSSO, and other education policy groups, and through scholarly conferences. We also plan to propose a working conference in association with one of the national large scale assessment meetings to discuss process to date and exchange best practices with other SEAs and partnerships.

**Figure 1. Longitudinal Data System Mind Map**



*Design*

In creating a tri-state strategic plan we have identified five key components necessary to accomplish the long-range strategic goals of implementing a data portal, designing a warehouse, and creating linked data sets. These are: (1) data analysis and researcher requirements, (2) data access policies, (3) data dictionary, (4) data warehouse, and (5) secure data transport.

Each state has agreed to share documentation on requirements gathering, design and functional specifications, testing plans, and user training materials. However, Minnesota must focus special attention on the areas of the data dictionary 3) data warehouse 4) and secure data transport 5) for any effort to be ultimately successful. While all of the system components must work together, these three issues will be central to Minnesota's success. Collaboration among the partners will occur primarily in the requirement gathering and design phases. Consultation among partners will continue across all phases. Figure 1 shows the primary design considerations for each component of the shared strategic plan, and Table 1—the tri-state task matrix—(in Appendix A) outlines the respective contributions of each of the partners to each design component.

*Minnesota Notes*

Minnesota will fully collaborate in every aspect of the shared strategic plan. The consortium explicitly recognizes that each state is at different stages of development and has different particular areas of emphasis, given their specific needs. Good data architecture is central to the success of any enterprise system. Minnesota has already begun work on a state level data model. Through this grant it will be tested against the existing and anticipated business needs of not only Minnesota but the other partner states. This effort will position the warehouse and related efforts at the center of the work of agency.

Minnesota's uniquely plural educational structure and prevalence of local control under the coordination of a state agency requires additional emphasis on a model that supports parallel development of state and local data warehouse systems. As districts consider both local analytical needs and data confidentiality issues, the partnership's support for a service-oriented architecture (SOA[5]) that supports collaboration between state-level and locally developed services becomes a critical element of the project.

The deployment of an SOA model allows LEAs to draw on the resources of a statewide data warehouse in combination with local data to provide locally relevant solutions. This service model is particularly important for larger districts that have made significant investments in developing unique data tools and in the professional surrounding the use of those tools. An SOA model provides a framework for support locally-developed district solutions while expanding DPI's ability to collect, organize and share data within the state. This architecture also supports NCLB requirements and delivers economies of scale across many program areas.

## I. Project Design: Data Analysis and Research Requirements

The central driver behind the development of at data warehouse is the desire to provide better decision support services across the PK-12 system. In order achieve this goal, Michigan, Minnesota, and Wisconsin will examine the results of requirements analysis done by other states and check those results against the needs of our own stakeholders. The data collection for the

[5] Service Oriented Architecture is term used to describe loosely coupled-collaboration between applications. See http://www.javaworld.com/javaworld/jw-06-2005/jw-0613-soa.html for more information.

requirements analysis will be done a series of focus groups and surveys across state-, regional-, and district-level program managers, district and school leaders, teacher leaders and specialists, and representatives of the larger PK-20 system.[6] The partnership will consult with experts within the partnership and in national organizations working in this area.

WCER research staff will coordinate and support much of the data collection and analysis efforts for the Tri-State efforts. WCER will also leverage knowledge gained in other related longitudinal analysis work going in other large projects to take advantage of the latest work on analysis and implementation.[7] Partner SEAs will work with WCER to identify appropriate stakeholders to participate in focus groups and/or surveys. Surveys of school improvement planning documents and other tools designed to help support data use will provide additional insights into the data needs of key processes in system reform efforts.

Data collected for reporting purposes is, by definition, historical in nature. The focus is always on "how did we do?" and the data is analyzed with accountability in mind. In contrast, decision support systems are designed with evaluative components in mind, and can support a forward-looking approach. Therefore, the granularity and frequency of the information feedback should match the level and purposes of its use. For the improvement of instructional practices, fine-grained and frequent information, including feedback on instructional practice tied to learning is needed. At higher levels of the system, more aggregate and less frequent information feedback provides a sufficient basis for allocating resources, and for evaluating and refining policies.

Data systems should permit connections across a variety of educational data to foster access to and reflection on information relevant to teaching and learning. Reports and user training must be designed with particular attention to developing the knowledge base necessary for valid interpretation of the information so generated. [8]

As states begin to modernize data structures and improve publishing capacity, they will provide unprecedented access to robust state level data sets. Professional development must be carefully crafted and provided in context to support appropriate use of these new tools. Likewise, reports must be designed for the purposes of improving the understanding of educational issues, supporting the monitoring and improvement of teaching and learning, and increasing capacity to select effective teaching strategies.

Since value-added and longitudinal data analysis will be an important end-use application, Appendix B summarizes important features of these models and the connections between these models and the structure of a longitudinal data warehouse.

*User Roles*

If developed correctly, data portals can provide effective decision support tools for a range of users, including university level researchers, educators and parents. WCER will assist states in gathering and defining requirements to ensure that the needs of each user group are clearly identified and incorporated into the design specifications. It is our intention to include trained researchers, state staff, school board members, administrators, teachers, and parents in focus groups to better understand and define clear needs for a range of end users.

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[6] See the letters of support in the appendix of the proposal for a sample of supporting groups. They include urban, suburban, and rural districts as well as PK-20 partnerships.

[7] Both the Value Added Network and System Wide Change for All Learners and Educators (SCALE) are working with large urban districts to improve decision support efforts and identify successful interventions.

[8] O'Day, Jennifer (2002). Complexity, Accountability and School Improvement. Harvard Education Review

Once the full set of user roles is identified, the portal can be designed to allow appropriate access rights. This will ensure that confidential information stays secure, yet will permit researchers to aggregate information as required. Standard roles such as parent, teacher, school or district administrator, researcher with accredited organization, etc. will be included in the data model, and the research will inform how to combine available data for various groups.

*Data Access*

In the past, software applications stored role access information directly in application code. For example, deciding which user groups could access what information was embedded directly in Java or Visual Basic code. Making changes to these role access statements required expensive programming modification and retesting.

With the new generation of Model Driven Architecture (MDA) software, complex role-based access policies can now be stored directly in the data model with the metadata. Applications read these role-driven statements and allow appropriate access to specific data elements. Access permissions can also be changed by adjusting metadata without rewriting custom programming logic.

The tri-state group plans to develop metadata structures that store access roles directly in our data dictionary for policies that are common across our organizations. These would reflect written documents that are approved by data access policy review teams with each of our states. For example, role might permit a school principal to access average test scores for all states, but only individual student scores within his or her school.

Other access statements may allow individual states to customize options based on state statutes or even individual district-level policy. One example of this might be the minimum cell size for scores for a given sub-group. Another user role might allow classroom teachers full viewing rights to their student's prior year strand-level test scores even if those students came from outside of the district. These decisions might vary from state-to-state and even district-to-district. Determining the data access options for specific user groups will be a key feature of our initial focus groups.

Broad-based access to robust data sets can increase the likelihood that untrained users will use data to identify inappropriate causal relationships, or will combine data elements inappropriately. WCER will assist states in identifying appropriate statistical information to be provided for various user groups that supports best practices in school improvement solutions. The goal of the project is to design and implement data systems that will help users gain ability to focus on what is most appropriate for improving teaching and learning.

*Evaluation Criteria*

To ensure that data continues to evolve with changing policies in the areas of teaching and learning, testing and assessment, and school improvement, WCER will assist states in developing evaluation criteria that can be used to collect feedback from users and researchers through e-surveys incorporated into each state's portal. This feedback will be incorporated in annual updates to data collections and displays to ensure that the data portal continues to meet the needs of its users.

*Minnesota Notes*

The Minnesota legislature has indicated a desire to conduct statewide value added analysis that will be incorporated into the AYP system beginning in 2007 when state test data is available for grades 3-8. The content and architecture of the longitudinal data system will be designed to provide Minnesota Statewide Assessment staff as well as LEA users with data sets that will support a variety of value added analysis models to be done by connecting district, schools, and classrooms to student learning. This will improve local capacity to identify

programs and policies that are successful in improving student achievement and state capacity to provide longitudinal information to support educational policy decisions.

## II. Project Design: Data Policies

Effective management of comprehensive data sets requires individuals in each state department who will act as conduits between the technology staff, who build and maintain the collection and reporting systems, and the program area staff, who are charged with administering the policies that govern the data collection and reporting. This project seeks to develop a process that can be used across the partner states for identifying effective data stewardship practices.[9]

*Data Stewardship*

Enterprise-level data management requires specific organizational support to ensure that metadata models and definitions are administered efficiently, and data collection and analysis continues to evolve in response to user needs and policies. Executive sponsors, business process owners and data stewards are critical players in the process. In most state agencies the executive sponsors have the authority to enforce compliance with the various data collections. For example, in Minnesota, the Assistant Commissioner of Accountability is the executive sponsor of the NCLB data collection and reporting efforts. Business process owners are charged with implementing the policies as defined by the agency's executive team. Data stewards are responsible for defining the meta-data structures. These three roles comprise the data stewardship team and oversee the work with specific data sets to ensure that standard documentation processes are maintained, data domain values are defined, data quality rules are validated, and exceptions are resolved.

*Confidentiality*

All data systems designed in conjunction with this project will be aligned to state and federal data practices requirements, including FERPA. The data dictionary and the data security framework will address data confidentiality. First, the data dictionary will include a metadata tag for each element indicating the level of confidentiality. These tags will govern filtering and access across user roles. For example, student-level data will be filtered to suppress identifying information, unless specifically permitted by the user role. Some states may elect to pursue the option of allowing parents and students to retrieve student data from their warehouse. In such a system, parents would be permitted to see their child's and only their child's information. Researchers, on the other hand, might be able to aggregate all of the student information they require, and but may not be allowed to review individual student identifiers.

Second, the data portal will include a role-based security system requiring user authentication. The enterprise-level authentication process will allow districts to manage access to specific accounts for parents and staff. Other user roles will be managed at the state level.

*User Training*

Once the user groups have been identified and the data needs articulated, work can begin on the design of streamlined reports to be accessed through the portal. User guides and tutorials designed from the functional specifications of each state's system will be available through Web-ex sessions. Specific tutorials will be designed for each user role to accommodate the range of stakeholders intended to access the system.

[9] Data Confidentiality Guide of the National Forum on Education. Forum Guide to Protecting the Privacy of Student Information: State and Local Education Agencies, 2004.

In Michigan, CEPI has successfully developed a training model based on a partnership with education associations such as the 57 intermediate school districts (ISDs), and the Michigan Institute for Educational Management (MIEM), that trains district staff members (from support personnel to superintendent) and others targeted to specific roles. This partnership uses a "train the trainer" approach to delivering face-to-face and online training, with CEPI developing the user support materials, and the associations leveraging their expertise in professional development and training.

For the work proposed in this grant, CEPI proposes to work with Minnesota and Wisconsin to develop approaches to user training for the products of the partnership. All three states can leverage the process knowledge that Michigan has gained to provide meaningful training that will scale within each state's unique professional development infrastructure. Our states will use the National Forum on Educational Statistics "Guide to Building a Culture of Quality Data," as a framework to create professional development materials targeted toward school and district personnel who are responsible for providing high quality data.[10] With the completion of the warehousing and reporting infrastructure, new users will need data wizards and case-based approaches to successfully complete the activities required for data collection and the use of educational reports and data for ad hoc queries. CEPI proposes to work with Minnesota and Wisconsin to develop approaches to user training for the products of this partnership. All three states can leverage the process knowledge that Michigan has gained to provide meaningful training that will scale within each state's unique professional development infrastructure.

*Minnesota Notes*

Minnesota's Title I School Improvement Teams plan to use the on-line training developed through this grant in helping schools identified through the AYP system analyze data for school improvement planning. The aggregate data sets currently provided through the public web site lack the detail needed for customized analysis in school improvement planning. Some schools have state coaches who assist with local data reviews but the vast majority does not have access to outside assistance and support. The tools developed through this grant will equalize the decision support training Minnesota is able to provide to all of its schools across the state regardless of Title I status.

## III. Project Design: Data Dictionary

Once the data elements and user roles have been defined, the dictionary will become the cornerstone for the organization and maintenance of flexible data structures. Minnesota will be a leader in the tri-state consortium in this area. Each of the partner states collects large amounts of educational data, but definitions can be unclear or not systematically updated to reflect the most current policies, and in turn can render the data less valid for decision support. Currently there are only a handful of staff members with highly specialized skills who understand the complexity of existing differences in definitions and the complex relationship between the data from different program areas. This project seeks to facilitate the development of a shared data dictionary for use in cross-state longitudinal data analysis.

The data dictionary will be built and maintained by each state's staff but will be displayed on a shared public website accessible to users of each state's data warehouse. The dictionary will include formal web-based check-in and check-out procedures and version control

[10] National Forum on Education Statistics. (2004). Forum Guide to Building a Culture of Quality Data: A School and District Resource. (NFES 2005-801). U.S. Department of Education, Washington, DC: National Center for Education Statistics.

systems at the data element level. Each state will maintain a database of the time ranges for retention of specific data elements. For example, LEP classifications of students will have date ranges that are specific to each state's policies.

The data dictionary will conform to requirements for metadata at the federal and state levels. Tools to develop both schema and sub-schema will be integrated into the environment, and regression analysis tools will be configured to test the data dictionary for consistency and completeness. As part of the design process, all current data elements and structures in each state will be catalogued and defined for inclusion in each state's dictionary and warehouse. Specific design components are outlined in the following sections.

*Student Data*

High quality educational research depends on a student data system that can provide both aggregate and individual-level data based on a variety of elements, including student demographics, test information and disciplinary information. The categories below illustrate the data sets that will be included in each state's warehouse.

| | |
|---|---|
| P-20 Student-level data: | Student identifier, student demographic characteristics, grade level and home school, program completion and certifications, special program participation (special education, limited English proficient, etc.) dates enrolled (if mobile student), student test scores, attendance, and discipline. |
| Data associated with student assessments: | Scale: development scale, proficiency rating, raw score, percentile, normal curve equivalent, item score. Content grain size: subject, strand or topic, item. Standard error of measurement, testing date, and test form. |

*Staff Data*

This project seeks to expand the data resources in each state by developing teacher identifiers that can be used to link teachers to specific students, and to provide further information about classroom and school experiences for clusters of students. WCER will take the lead in researching policy issues, and in assisting states to conduct focus groups to determine which of these new data elements should be included in the design of the warehouse. Specific data elements might include staff identifiers, course titles and descriptions, teacher certification information, etc. The inclusion of these new data could also make it possible for teacher colleges to potentially track the performance of recent graduates.

*School and District Data*

While student outcomes are the primary focus of educational accountability systems, this data must also be associated with schools and districts. Adding school and district identifiers to the data warehouse will allow important program-level aggregations of the student data sets.

| | |
|---|---|
| School-level data | School identifier, school features and programs, and school-wide professional development. |
| District-level data | District identifier, district features and programs. |
| Finance data | State aid, accounts/account groups, property text rates/equalizing housing values. |

*Linking Data Sets*

Each of the partner states is at various stages of implementation with regard to student identifiers. While Minnesota has been assigning unique student identifiers at the district level for over 10 years, there is too much noise in the system to support valid longitudinal analysis. ID numbers are reported by the districts as historical records, and are maintained by the state. The state uses this historical information to produce an ID repository, but it is based on "closed" reported data, which can be as much as 18 months behind the current ID assignments. This lack of real-time validation makes it nearly impossible to have current student-level data available for use by parents or educators. This is of particular concern for mobile or migrant students.

As part of the data warehouse component funded through this project, Minnesota will create a transactional student ID system to provide real-time authentication of student ID numbers. This improvement will prevent duplication of ID numbers when students transfer by providing a current look-up, to more easily find or assign identification numbers for new students. With valid student IDs, the integrity of the data set will permit the kind of linking necessary to support a variety of value-added analytic models.

*Data Portal*

The ultimate strategic goal of each state is to design an education portal to facilitate on-demand requests for reports, and to ease the burden of local data submissions. The combined vision includes the development of a series of web services that will provide real time feedback to improve the editing process involved with data submissions, and provide a series of reports and data analysis options for a variety of user groups.

Leading data publication tools in the marketplace include the Cognos Suite of Business Intelligence Tools, and Microsoft Business Intelligence Tools. While the partner states plan to explore the purchase of a single business tool to leverage buying power, our warehouse design will be tool-independent. It will not be necessary to purchase the same product across all three states. The partnership will permit states to collaborate during the design and analysis phases, resulting in a more informed purchase decision for all.

Regardless of the business intelligence tool(s) selected, portal designs will permit unique views of the data required by each user group while ensuring that edit and access policies are enforced, and secure data transports are used.

*Minnesota Notes*

Minnesota has already begun the process of organizing state data into a dictionary. We have a data architect on staff who has created preliminary data elements. The core data dictionary is expected to be complete by December of 2005. This grant project will provide us the additional feedback and collaboration to ensure the model is sufficiently robust to meet both state and federal reporting requirements by involving the partner states in a parallel staging and testing process. Without this collaboration the effort is at risk of being too state-centric for long-term viability. In order to complete this project in a timely manner and facilitate the next step of adding the data to the data warehouse additional staff will be added to this effort with the support of this grant to increase the number of data sets to be included in the dictionary. The goal is to have all of our testing, student, staff and financial data into catalogued in a dictionary by spring of 06.

## IV. Project Design: Data Warehouse

In 2006 each of the partner states will for the first time have uniform testing data from grades 3-8 and high school. This will make it possible by 2007 to conduct value-added analysis of student performance on state exams, and link this new test data to additional school and

teacher information to research a variety of issues. Even though the data will be available, if significant adjustments are not made to existing state systems, it will not be useable. . Minnesota has begun to develop a prototype of a data warehouse which we will share with the tri-state consortium as a design model. Each state currently stores its data in legacy systems that do not permit flexible data modeling. This project will support a successful transition to a decision-support system that leverages data stored in these legacy operational systems. The model shown in Figure 2 (in Appendix B) illustrates how a comprehensive data model can be built with the incremental inclusion of existing data sets as time and funding permits.

The partnership requirements analysis team will:

- Leverage the technical expertise of each state's IT department and contractors
- Ensure consistency among states
- Develop a common set of implementation standards
- Use a common dictionary to ensure longitudinal data analysis across states
- Ensure that the design is vendor neutral
- Promote industry standards and best practices

*Data Modeling*

The success of each state's education data portal is directly linked to the quality of the underlying data model. Collaboration among partner states will facilitate the identification of similar high-level data groupings common to educational systems, and decrease the likelihood that individual states may miss critical components. The warehouse design will be based on metadata models that conform to federal standards, including fact tables and conformed dimensions as described by Kimball. [11]

The mapping scheme will capitalize on commonalities across states, yet permit variation in naming conventions to ensure that local nuances are preserved. By incorporating these nuances at the initial design stage it will be possible to maintain high levels of data integrity without compromising interoperability. The tri-state data model will map to elements defined by NCES, and EDEN and be compatible with School Interoperability Framework (SIF) standards. The model shown in Figure 2 also illustrates how existing data will be transformed through platform-independent connections and will reside in a series of data marts created from existing and new data elements.

*Minnesota Notes*

Minnesota has launched a data warehouse initiative and has pilot test and assessment data available internally. This initiative includes a vision for an enterprise directory and security system within an interoperable framework. While we have hired an applications systems architect to lead this effort and have good beginning design specifications progress is slow. The goal is to have an MDE data warehouse, data marts and data collections applications that are SIF compliant with role based access from internal and external sources available by the end of FY 07. Because we must, as all SEAs, continue to support legacy applications during the design and implementation of new state of the art systems without additional support from this grant our effort is in jeopardy. Minnesota has been able to hire architectural staff but not staff to implement the new models and designs. In order to complete this project additional staff will be added to this effort with the support of this grant.

[11] The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data. John Wiley & Sons, 2004.

## V. Project Design: Secure Data Transport

This project will expand on work done by SIF and other industry standard interoperability procedures. Minnesota's application system architect will take a leadership role in providing design and staging models for the partner states with this component. Interoperability between the federal government, states and districts can be accomplished by developing a data model that includes necessary transformations required by a variety of entities. These transformations will be automated so that information can be supplied securely, quickly, and accurately across systems. Figure 3 (in Appendix B) illustrates how that transport would operate under a typical environment of state standards and accommodating local options—the parallel data warehouse structure.

Notably, this plan represents an approach to statewide data standards that is the least disruptive to local activity and choice. Districts and schools may continue with current arrangements in all other respects and may choose a communication arrangement that best helps them meet state/federal requirements and submission deadlines.

Currently, each state collects data in a variety of ways, from a variety of organizations, including districts, charter schools and data management companies. It is collected and transported at different times throughout the year using a variety of different methods. Some of the data is uploaded via a website, some is submitted through e-mail, and some is entered directly into the mainframe. Each of the various collection systems requires submissions in different kinds of fixed or formatted files. The only "transactions" that occur are data corrections done on the user side that are subsequently batch loaded into the mainframe system. They tend to be confusing procedures for users, expensive to maintain, and prone to error due to the variability of requirements and the lack of real-time feedback across submissions.

*Open Architecture Platform*

To address the need for vertical integration of data collections, each state will begin the design and implementation of enterprise-level service-oriented architecture (SOA) The SOA will be designed around a single set of standards and will permit users to submit data through the portal. Rather than requiring users to build a series of export capabilities into their software for each of the current "state systems," the new SOA will only require interaction with a single interface. This system will accommodate either batch-oriented or transactional formats.

The SOA will include editing capabilities with a guaranteed delivery system to ensure that data is submitted error-free. Allowing districts to submit data through a single web portal that can accommodate a range of data preparation methods will dramatically reduce data management costs for districts, and will provide access to reports in near-real time.

Secure transport will ensure that data sent can only be seen by the intended recipient. This will involve several technologies that can be purchased from vendors through this project, including XML security appliances and Web Services Security. These tools will be integrated into the architecture of the warehouse and will ensure confidentiality of data across the variety of users. Figure 3 (Appendix B) shows how schools and districts will be able to send data to the state for inclusion in the warehouse, as well as access transformed data through the portal.

*Open Architecture Platform and Vendor Support*

The added benefit of Model-Driven and Open Architecture is the ease with which new applications may be developed and new software may be conformed to fit the tri-state structure (see Figure 4 in Appendix B). Sometimes these applications are built in-house, but more often than not, they are developed by outside vendors. Software vendors and other technology firms have expressed their support for projects of this type.

*Data Collection*

Data collection is a crucial piece of data transport as outlined in this section, and will be a focal point of Michigan's leadership. Michigan has been collecting data from local education agencies for years using the first-generation Single Record Student Database (SRSD) and the Unique Identification Code (UIC). This Longitudinal Data Systems grant will enable the state to redesign the student UIC system to integrate with all student source systems and to become flexible enough to synchronize with multiple federal and state reporting requirements. Solving this alignment problem will virtually eliminate the duplicative reporting that currently costs districts significant time and resources. Designing the SRSD/UIC in a modular and extensible framework will enable Michigan to connect data sets from a variety of source systems and link the data across time, as well as share common modules with other states.

In Fall 2004, Michigan began integrating the UIC with state assessment source systems through a process that proved effective for one test cycle, but which remains labor-intensive at both the state and local levels for data entry, cleansing and tracking. We propose a system re-design that will enable data cleansing and validation before data is submitted to the state and which will facilitate tracking of students across assessment cycles and throughout participation in programs and services. In addition to allowing district staff members to collect data and maintain and correct student core demographics, this integrated system based on the UIC will allow teachers to drill down to the student level to view a student's scores on previous and current state assessments, as well as images of constructed responses. Michigan's early investment in the SRSD/UIC system and associated student data source systems will enable other states to accelerate their student tracking implementations for longitudinal data management.

*Minnesota Notes*

Minnesota has over 500 districts with a highly decentralized governance structure. While some of the districts have very sophisticated data management systems others provide data in excel files. There is currently no state support for less sophisticated districts and antiquated data exchange systems for all. Our strategic vision includes building an interoperable framework where the state can serve as a hub facilitating data exchanges between districts and the state and from district to district. While our vision of an open-architecture infrastructure combined with the data portal will allow us to respond to the variety of data needs that currently exist in the state as we are required to support legacy interchange standards in parallel with SIF interchange standards our efforts are in jeopardy without additional support from this grant. Our architectural staff is able to create the design, but we need to use grant funds to hire staff to implement the models.

## Project Personnel

*Minnesota Personnel*

i. Minnesota agreed with the August 2004 DSAC assessment and used the report to launch an initiative to hire additional staff with superb technology and organizational in the Information Technologies division over the past several months who will contribute in important ways to the success of this proposal. This grant will be used to augment the capabilities of the existing MDE IT staff to develop a full-service longitudinal data system. Existing personnel will be assigned to work on and/or manage specific parts of this project. *Additional personnel funding provided by this project will be crucial to the success of this project, and will be used to hire additional staff. Appendix B, Table 2 contains information about additional MDE staff who are available to work on this project.*

**Cathy Wagner** is the Director of Information Technologies. She has helped to shape a strategic vision that will not only result in modernizing IT services at MDE but will ensure that educators have useful technology tools that support informed data driven decision making. She oversees a staff of information technology personnel who provide services to the agencies 400 + staff. Ms. Wagner represents MDE at the federal level with the National Center for Education Statistics, the CCSSO Accountability SCASS and participates in various advisory groups at the state level and throughout Minnesota. Before joining the IT division, she planned and directed the design and implementation of a variety of state level initiatives in response to requirements of the Elementary and Secondary Education Act including the Minnesota NCLB AYP system, statewide assessment programs in reading, mathematics and writing and school improvement models for urban schools. Her in-depth knowledge of K-12 education as well as her vast experience in implementing new educational and technology initiatives at the state level will prove invaluable as she guides a technical team in the implementation of full decision support system that will revolutionize data management in the Minnesota educational community. Ms. Wagner holds an MDE in Educational Leadership from the University of Minnesota. Cathy is schedule to devote 25% of her time to this project.

**John Paulson** is the MDE software development manager and has over 20 years experience in managing software applications development. Mr. Paulson is a technology product visionary and serial entrepreneur. In his role at MDE, Paulson is focused on organizational development, implementation of strategic vision, and modernizing the MDE data collection, reporting and analysis infrastructure. In his first months at MDE, John has hired seasoned enterprise and data architects, mapped out a technology implementation roadmap, and revamped service goals for the IT development organization. Before joining MDE, John created and managed software companies that developed products and provided services specializing in integrating the disparate information systems at fortune 500 giants such as Boeing and Ford Motor Company. His in-depth experience for managing new and complex development efforts will provide the longitudinal data analysis implementation team with flexibility, while retaining structure and confidence. Mr. Paulson hold a B.S. with Honors is Psychology, and an M.S. in Computer Science, both from the University of Iowa. John is scheduled to devote 25% of his time to this project.

**Brian Hecht** is the MDE systems application architect**.** Mr. Hecht has over 20 years of information technology technical leadership. In his role as application architect, Mr. Hecht has overall responsibility for technology practice and implementation at MDE, including best practices, make vs. buy, security, and technical direction. Before joining MDE, Mr. Hecht was Chief Technology Officer for Ensodex, Inc. a multi-national software corporation specializing in creating composite value by joining information from silos of legacy information systems. In that capacity, he created corporate and product strategic technology vision for a broad line of

products. Mr. Hecht's broad insight in the IT sectors technology direction and broad experience information systems will provide a solid technical foundation for the longitudinal analysis system development. Mr. Hecht holds a B.A. in Computer Science from Luther College, and an MBA from the University of St. Thomas. Brian is scheduled to devote 75% of his time to this project.

**Dan McCreary** is the MDE data architect. Dan McCreary is an executive-level technology evangelist with a strong track record of creating highly effective technology service organizations. Mr. McCreary has a rare combination of technology understanding and excellent strategy development and presentation skills. Mr. McCreary will be leading the effort to create educational information exchange standards based on the need to provide multi-jurisdictional educational exchange between districts, states, and federal agencies. In his most recent role, Mr. McCreary was involved in the Minnesota criminal justice information integration and exchange system, CriMNet. The CriMNet project objectives were to provide statewide standards and systems for securely exchanging data between over 1,100 computer systems. Mr. McCreary's broad experience in meta-data modeling required for exchanging information across disparate agencies will provide a solid foundation for the Longitudinal Data Systems project. Mr. McCreary holds a BA in physics and Computer Science from Carlton College, MN, and an MS in Electrical Engineering and Computer Science from the University of Minnesota. Dan is scheduled to devote 100% of his time to this project

**Craig Rhombs** is MDEs lead project manager for the Longitudinal Data Analysis effort. Craig has 15 plus years experience in managing complex software development projects. In his career, he has managed deadline driven and complex efforts ranging from energy management, data communications and telecommunications as well as health care and retail. Craig's broad project management background made him a natural to manage the complex NCLB compliance projects, resulting in on-time deliveries and high quality systems deployments in a technically complex and challenging environment. Mr. Rhombs also brings management experience relating to GIS and Business Intelligence to the project. Mr. Rhombs has a BA, Magna Cum Laude, Phi Beta Kapa from Vanderbilt University in Physics and Astronomy, an MS in Astronomy from the University of Iowa, and an MS in Computing and Information Science from Trinity University, San Antonio, Texas. Craig is scheduled to devote 50% of his time to this project.

**Patrick Plant** will serve as a principal district liaison for MDE and the partner states in conjunction with this grant project. Originally a certified classroom teacher, Patrick has been in K-12 Administration for over 27 years with responsibilities ranging from districtwide community involvement to leading major technology initiatives. Currently he is Director of Technology and Information Services for Anoka-Hennepin School District #11. Some of Patrick's accomplishments include: being a successful administrative application developer (both educational and commercial), a highly-regarded presenter/trainer, having authored or been featured in a number of national educational publications and having lead the district in a very successful multi-million dollar competitive grant process. Besides in working in Anoka-Hennepin, Patrick acted from September 2000 to June 2001 as Interim Director for the Schools Interoperability Framework (SIF), a non-profit, open-platform, industry-wide educational initiative to enable schools and various governmental systems to seamlessly share data between discrete applications. Patrick is scheduled to devote 5% of his time to this project as a district consultant.

*Wisconsin Center for Educational Research Personnel*

**Dr. Robert H. Meyer (Principal Investigator)** is director of the newly-established Value Added Research Center at WCER. Before joining WCER, Meyer was on the faculty of the University of Chicago (Harris School of Public Policy Studies) and the University of Wisconsin (Economics Department). Meyer is known for his research on value-added modeling and evaluation methods. Over the last decade and a half, Meyer has worked closely with districts and states to develop and apply innovative statistical methods. He has conducted major statistical evaluations of programs and policies such as SAGE (the Wisconsin class-size initiative), systemic reform in Texas, integrated versus traditional mathematics, and professional development and other math and science reforms. At the other end of the evaluation spectrum, Meyer has worked with numerous districts, including Minneapolis and Milwaukee, to develop and implement value-added indicator and accountability systems. He has led several AERA pre-sessions on value-added indicators. Meyer will coordinate collaborative cross-state research, oversee research on end-use data applications, and direct research activities conducted at WCER. Meyer will allocate 40% of his time to this project (split across the three participating states). His remaining time will be devoted to related research projects: developing and implementing the next generation of value-added models and indicators with district partners Milwaukee, Minneapolis, and Cleveland (funded by IES and the Joyce Foundation) and evaluating the Wisconsin SAGE program (a 12-year study funded by the Wisconsin Department of Public Instruction).

**Dr. Chris Thorn** is director of Technical Services at WCER. Thorn has been actively engaged in both large-scale program evaluation work, as well as mixed methods analysis of school- and district-level decision-making for the past 15 years. Thorn managed the Spencer-funded evaluation of the Milwaukee Public Schools Voucher Program for 5 years and a state-wide evaluation of school-to-work programs that included a mixed-methods analysis of participation, and a study of workplace and higher education outcomes. He has worked extensively with state-wide student data and with data sets from large districts, including Los Angeles. At the district and school level, Thorn has developed and implemented data-based decision-making and decision-support tools and provided related professional development. Thorn's recent scholarly writing has focused on the characteristics of successful decision-support systems in schools and districts. Thorn will coordinate collaborative cross-state research on information technology and decision-support tools. Thorn will devote 30% of his time to this project. The remainder of his time will be devoted to related research: building a data warehouse and indicator system for Los Angeles and other districts participating in WCER research projects and directing technical services to support research at WCER.

The remaining WCER personnel are grouped into three teams: management; information technology and statistical computing; and research and applications. The following senior faculty will be available as project consultants: Dr. Douglas Bates, Professor in the Statistics Department, is an expert in statistical computing with large data sets, and is a core contributor to the R language for statistical computing and graphics. Dr. Julie K, Underwood, newly appointed Dean of the Education School, is a lawyer and expert on school law. Currently, Underwood is the Associate Executive Director and General Counsel of the National School Boards Association. Dr. Adam Gamoran, Director of WCER and Professor of Sociology, is a member of the National Academy of Education (NAE). Gamoran is widely recognized for his statistical analyses of educational inequality, particularly his studies of grouping and tracking in elementary and secondary schools. He has published numerous articles analyzing achievement growth in national, state, and school district data sets. He has extensive experience with

multilevel modeling, and teaches a graduate seminar on multilevel models of school effects. To economize on space, the remaining WCER faculty, IT staff, and research staff who are available to work on this project are listed in Appendix B, Table 3.

**Resources**

The Minnesota Department of Education (MDE) is the state agency presiding over 590 school districts, over 2,000 schools, and in excess of 950,000 students. It serves as the key conduit for educational support and service statewide. MDE is the source and allocation division for over 100 percent of state education spending, insuring that state aid is equitable, efficient, appropriate, and within state legislative and fiscal goals. MDE administers grant programs to augment funding for districts and schools with special needs and supplemental initiatives, both through state and federal funding. The role of MDE in solving communication and information-sharing problems in state, local, and federal education systems is to encourage and facilitate the design and implementation of enterprise-wide technology solutions. The MDE emphasis has not been to mandate technology design, but rather to offer options, planning, and support from a statewide perspective, so that districts may make the choices best for them. In light of this mission, MDE realizes that statewide leadership and coordination is critical to the development of efficient and effective education information systems within an enterprise framework: a defined set of principles, standards, and policies for education integration.

*Project Support*

Support for this vision is not only evident at the agency level, but across the state. Attached to this document are letters of support. These letters represent support from the Deputy Commissioner, school districts, national level policy boards that influence state education and information technology policies and technology leaders in the private sector. They have been informed of our project plan and are aware of the potential for interstate cooperation.

Minnesota is a local control state, and MDE is traditionally reluctant to interfere with district autonomy without compelling reason to do so. The rationale for this has been the philosophy that teaching and learning decisions are best made closest to where the teaching and learning occurs. Districts and schools are very different from one another across the state. For this reason, they are allowed to operate in an environment that enables them to creatively use resources to meet challenging and often differing local needs; the state's role is to facilitate the use of resources. Excessive regulation can be an impediment to this process. Increasingly and with some irony, Minnesota has realized that in order to best help districts make their own decisions; to help districts fulfill data requirements efficiently; and to help distribute the financial, resource, and organizational burden of its increasing information management responsibilities, it must take a leading role in state education data.

MDE is housed in the Roseville educational facility and is responsible for a technical infrastructure which networks computers for over 500 full-time employees. To accommodate a longitudinal data systems project, we anticipate an increase in development staff and other resources needed for the three-year period. There are over 50 professionals associated with the division Information Technology at MDE. We operate an Internet web presence and an intranet presence and have begun to rapidly expand our data management and application development capabilities since 2003. MDE is currently running over 80 test and production database servers on site, and has instituted formal application development and security procedures.

*Funding*

Data and software development projects are funded and will continue to be funded with money allocated internally to the Information Technology area. The CELT study makes clear that MDE is underinvested in technology for the role it needs to play in the coming decade. To

fill this role, MDE plans to add sources of funding—both internal and external—to sustain the systems that are designed in this application after grant expiration, and to provide means for applying the design toward useful program-area applications that will have value across the agency. Shifting assignments and architecture will undoubtedly have negative immediate fiscal impacts, both on development and on organizational adjustment to new roles and responsibilities. We are not naïve enough to expect our project to be the exception to this rule, but we have learned from successful government applications in enterprise data that investment does pay off. Given the great degree of interest surrounding implementation, we are optimistic about external and partnership funding prospects. While it is unclear how much saving is possible by integrating state data activity at a high level, there is no question that these savings would be substantial.

*WCER Resources*

The **Wisconsin Center for Education Research** is one of the nation's oldest and most highly esteemed university-based education research and development centers. A part of the University of Wisconsin–Madison's School of Education, WCER provides a productive environment where some of the country's leading scholars conduct research. WCER research spans the full scope of education, from the effects of infant child care and after-school programs to undergraduate and graduate curriculum reform. With annual extramural funding exceeding $22 million, WCER is home to centers for research on the improvement of mathematics and science education from kindergarten through postsecondary levels, implementation of reading and behavior intervention models for K-3 students, and education policy, as well as a comprehensive regional assistance center that supports schools and agencies in meeting the needs of schoolchildren throughout the Midwest, with priority given to high-poverty schools and districts. A commitment to disseminating research findings and research-based educational interventions and products has characterized WCER from its inception.

WCER's work on this project will be the responsibility of the **Value-Added Research Center** (VARC), the newest and fastest growing research center in WCER, and the Technical Services Department at WCER. The mission of VARC is to promote the development, application, and dissemination of value-added and longitudinal research methods to evaluate the performance and effectiveness of schools, teachers, programs, and policies; facilitate the use of value-added performance indicators to monitor the performance of schools and hold them accountable for their performance; and support data-driven decision-making at all levels of the educational system. VARC is currently working with numerous districts, states, and universities, including Minneapolis, Milwaukee, Cleveland, Los Angeles, and the states in the tri-state partnership. The Center is also doing basic research on the statistical foundations of value-added and longitudinal research methods. VARC's work is currently funded by the Wisconsin Department of Public Instruction (a twelve year study of the SAGE program), the Institute of Education Sciences, the Joyce Foundation, Milwaukee Public Schools, the National Commission on Teaching and America's Future, and the National Science Foundation.

The **WCER Technical Services Department** provides multimedia services, custom software development, and computer support for more than 350 networked computer systems. Advanced database services have taken on an increasingly important role within WCER Technical Services. Technical Services is currently supporting data warehouse ETL and analytics on an active-active cluster of two dual-processor 3.6 Ghz Xeon servers with 8GB RAM. These servers are each running Enterprise MS-SQL 2000 on Windows 2003 Advanced Server. The servers are connected through redundant paths to a dedicated EMC CX300 Storage Area Network (SAN). Both the cluster and SAN allow considerable expansion through additional nodes.

More importantly, Technical Services has also reallocated staffing to better support the

advanced needs of data-intensive research projects housed at the Center. We currently have two full time database application developers, an ETL expert, and a data system architect on the staff. This team has experience designing research systems as well as working with research and information system staff at large districts as they coordinate with project research teams to support the analysis of complex longitudinal data.

The WCER Technical Services also supports the use of a number of different collaborative technologies, including large-scale, toll-free teleconferencing, point-to-point video conferencing and web-based desktop sharing tools. However, the most significant contribution that WCER makes to collaboration over distance is its expertise in web-based collaboration tools.

WCER has deployed an enterprise-level web-based collaboration environment called SCALEnet to support distributed work across complex partnerships. SCALEnet's ability to support complex work processes and its utility as a knowledge management system facilitates partnership collaboration, data-sharing, and inquiries. Behind the scenes, SCALEnet provides a relational database for tracking and reporting project activities, tracking project outputs, and monitoring status. It offers a web interface that allows remote management of files (including version control and approval processes) as well as coordination of tasks and calendars.

The tri-state partnership's space inside the SCALEnet environment has been named the Longitudinal Data System Community Space (LDSnet for short). This space is explicitly designed to foster the development of communities of practice across the partnership. In addition, several communities within SCALEnet have considerable overlapping interests with the tri-state partnership. One large NSF-funded project is working on longitudinal analysis of student and teacher data in the Los Angeles Unified School District. We are already discussing avenues for sharing best practices and technology assessments between groups. The SCALEnet infrastructure makes such sharing easy. Indeed, the proposal preparation process was greatly aided by the availability of a secure, flexible, collaborative environment that could be shared by all partners.

The UW-Madison **School of Education** is consistently ranked one of the top schools of education in the country. *U.S. News & World Report,* in the 2006 edition of its guide to the best graduate schools of education, ranked the UW-Madison School of Education ninth in the nation; in the specialty rankings, the School of Education came in first in curriculum/instruction; second in educational psychology, elementary education, and secondary education; and third in education policy and education administration. The **University of Wisconsin–Madison** is recognized throughout the world as one of the great U.S. universities. Its academic reputation has been rated among the top 10 in the country in many areas of study since the beginning of the last century. *U.S. News & World Report* currently ranks UW-Madison seventh among U.S. public universities.

## Management Plan

Management of project planning and work activities within and across the three collaborating states and WCER is obviously a crucial part of this project. WCER will be responsible for managing cross-state activities. As discussed in the previous section, the Partnership will use (and has already made effective use of) LDSnet/SCALEnet, a powerful web collaboration tool for exchanging work products and managing the work activities over time. The state project directors and the WCER principal investigator will manage work activities within each of their respective organizations and serve as the steering group for the entire project. As is explained below, the project has been divided up into distinct task areas: data analysis and research requirements, data access, data dictionary, data warehouse, and secure data transport. Each of these task areas has been further divided into subtask areas. As indicated in Appendix A,

each state and WCER has been assigned a specific level of responsibility for each subtask: (1) primary responsibility, (2) secondary responsibility, or (3) review and implementation. Separate management committees will be created for each task area and will be staffed by key personnel from each organization. The project steering committee will interact with the task management committees to ensure that the task work is being completed in a timely and high quality manner and to ensure that the work of the different task groups is coordinated. One of the major strengths of the proposed project is that the design of the data warehouse and data dictionary will be driven by the end-use needs of educational stakeholders. As a result, coordinating the work of the task groups will be an important priority.

The tri-state plan has several distinct positive features. In addition to the operational synergies and standardization that is the cornerstone of shared overall design, we are designing the project timelines to proceed in discrete increments to avoid the systems version of "analysis paralysis"—taking on too much design without implementation. Small successes will ensure that investment in a particular area is captured and used and that blueprints for a grand system do not languish on the shelf. For more detail, refer to the collaborative task list and the companion timeline to this application in Appendix A. Incremental inclusion of more data collections and more stakeholders into the designed system will aid in supporting modular development. A requirement that this grant stipulates, and that all three states must live by in an era of tighter state budgets, is to make the maximum use of resources by managing projects to plateaus—intermediate goals that are standalone improvements such that if no more support were given, the improvement would persist. Likewise, these functions also must be as independent and self-contained as possible.

**How Do We Get From Here To There? State Cases**

The following cases serve as examples of areas of state leadership in the proposed grant. They serve as indications of strength in each state, and commitment to participation in the project. During the grant process, we have successfully networked many areas and have begun to identify areas of strength, shore up areas of weakness, and have been able to help each other become more focused. This grant is a testament to the abilities of these three states and the trust built during this process. Here are some cases to illustrate how the tri-state partnership will use their network *to get from here to there.*

*Wisconsin*

An important goal of a longitudinal data system is to provide information that is instructionally relevant. The decision support challenge at the classroom level is the ability to deliver relevant data to teachers in a timely fashion. Unlike many indirect benefits of a data warehouse, delivery of data to teachers represents the closest link to student achievement that this project offers. While the member states recognize the sensitivity of collecting teacher information, in order to have the most profound impact on student learning, teachers and students must be connected at the individual level. Without this connection and ability to have student information pass from teacher to teacher, information gets lost. With a comprehensive system, teachers will have the opportunity to be assigned students, prepare in advance for their incoming classes, and upload/download rosters to use for classroom management with all integrated DPI information about their students at their disposal.

Student transcripts are another challenging area in which DPI is taking the lead. Establishing a transcript requires gathering classroom level information. Wisconsin will be updating its existing teacher licensing system and has the opportunity to reassesses its collection of staff data. By assigning a staff ID, DPI can create a mechanism to give teachers access to student data, in conjunction with the architecture developed under this grant. This reassessment

will coincide with plans for integrating staff data with student information including, (a) the design of data elements, (b) role-based security, and (c) warehouse inclusion. The project will begin by examining elementary schools, linking teachers and classrooms, and culminate in a pilot project. Concurrently, DPI and WCER will conduct focus groups with the aim of determining teacher needs. This will allow enough time for role-based security to mature to the level needed for the amount and sensitivity of the data required.

*Minnesota*

The longitudinal data systems being built by each of the partner states will organize and store vast amounts of educational data. Much of this data is currently being collected, but they are stored in stove-pipe legacy systems that do not lend themselves to easy access or flexibility in creating reports. Much work is needed to develop an infrastructure design that will support the creation of robust data models and data marts contained in a data warehouse. Minnesota will take the lead in researching and developing a shared data model for each of the partner states that will drive the development of a collaborative data dictionary and the design of the data warehouse.

As soon as grant activities begin we will research a structure to accommodate a series of data elements that conforms to the federal ISO-11179 guidelines. Special emphasis will be placed on externalized data elements, or data elements that move between systems to adhere to interoperability. Our intention is to correctly identify similar high-level data structures (for example, *activity*, *document*, *student*, *person*, *report*, and *organization*) to permit adherence to national standards while maintaining individualization in order to accommodate nuances specific to each state.

The collaboration of this project will ensure that the data model is robust enough to meet the needs of various user groups, including parents, teachers, educational administrators, and researchers across states.

*Michigan*

The comprehensive longitudinal data system proposed in this grant will provide key stakeholders with (a) data that are aggregated at the school, district and state level and (b) individual student data at a very granular level. In addition to a new level of aggregated reports that are useful across a state, Michigan will lead the development of an integrated student data system that will provide a dramatically different kind of student data environment from the perspective of key stakeholders. Teachers, administrators and appropriate district personnel will be able to drill down to the student level and both securely enter data and view reports through role-based access.

For data collection, the following examples show how different users will access parts of the system that will help them to achieve their work:

- Pupil accounting and official records personnel can use the online system to either key in or upload student data into a workspace, review aggregated reports of data for uses such as accountability or program participation, correct data and submit for official snapshot dates that align with reporting deadlines. Official records staff members are the "keepers" of the core student data, including demographics.
- Special education staff members will be able to enter and review program-specific data on participating students and the system will facilitate the maintenance of the core data so that demographics are synchronized with one official version sent to the state.
- Assessment coordinators can enter and review specific data on students to assist in the pre-ID printing of assessments with the UIC, and the system will facilitate the

maintenance of the core data so that demographics are synchronized with one official version sent to the state.

Examples of personnel who need secure access to view student data include:

- Teachers who need to look up new students and see how they performed on previous state assessments by content expectations, so that they don't waste valuable instruction time duplicating assessments while waiting for record and transcript transfers.
- Principals, who can quickly provide students with needed services and use student data for instructional leadership and school improvement activities related to accountability measures.
- Appropriate personnel who manage and maintain student records from student intake through integration into the districts' local student information system integration, thus reducing data entry error at the source.

The proposed system will achieve the four primary components of NCES's "Culture of Quality Data" that include: accuracy, security, utility and timeliness.

**Dissemination and Outreach**

This project is structured to produce deliverable products, so that the tri-state partnership can work efficiently on different parts of the project plan and share the results of this distributed work with one another, and with other interested parties. As discussed above, the partnership will use (and has already made effective use of) LDSnet/SCALEnet, a powerful web collaboration tool. LDSnet will also be used to make products available to stakeholders within each of the three states, with other state educational agencies, and with researchers and vendors.

Project results, including overview papers that describe the concepts and strategies used in this project, will also be disseminated via conferences and workshops, such as the Large Scale Assessment conference sponsored by CCSSO, the NCES Forums and Management and Data Conferences, the American Educational Research Association and National Council on Measurement in Education Annual Conferences, and other appropriate forums.

The tri-state partnership will also work with stakeholders in the three-state area and elsewhere who are involved in promoting and supporting the development of longitudinal data system capacity, longitudinal research, and data-driven decision-making. As mentioned previously, several districts, including Minneapolis, Milwaukee, Mounds View (Minnesota), and Cleveland are currently working with WCER to develop a self-help network to support value-added analysis and other data-analytic activities. The Partnership expects to make an important contribution to the development of this network among state-level actors.

**Conclusion**

We believe that a collaborative strategy that draws on the strengths of multiple states and the full spectrum of stakeholders and vendors is the key to developing and implementing a longitudinal data warehouse in a high-quality and timely manner. We appreciate the opportunity to submit a proposal to the Institute of Education Sciences to pursue this strategy and look forward to the possibility of working with IES and other states in this endeavor.

**Resumes**

**Minnesota Department of Education Staff**

**Craig Rhombes**
**Tim Vansickle**
**Jessie Montano**
**John Paulson**
**Catherine Ryan Wagner**
**Patricia D. Olson**
**Heather R. Britt**
**Brian Hecht**
**Dan McCreary**
**Liangsheng Cheng**

**Wisconsin Center for Educational Research Staff**

**Robert H. Meyer**
**Christopher A Thorn**
**Eileen M. Kellor**
**Douglas M. Bates**
**Christopher H. Fassnacht**
**Robert S. Glover**
**David J. Sleasman**
**Julie K. Underwood**
**Adam Gamoran**
**Daniel M. Bolt**
**Eric M. Camburn**
**H. Gary Cook**
**Richard Halverson**
**Anthony T. Milanowski**
**John l Smithson**

**CRAIG G. RHOMBS**

(b)(6)

(b)(6)

(b)(6) website: http://www.projectresultsinc.com/

***Summary***: A versatile IT project manager/leader with experience in large and small technical projects. Has a history of successful dealings with troubled projects, of making efficient use of human resources, and of creating successful outcomes that meet or exceed business user expectations.

"Working with Craig frequently becomes an opportunity to 'watch and learn' as he has the enviable ability to transition between being a project manager, subject matter expert, business analyst, customer advocate and mentor as the dynamics of a project require." – a former supervisor

***Successes and Strengths***

**Practical application of technical facilities to business needs**. Succeeded where seven previous managers had failed in stabilizing, upgrading, and providing a more functional software system that met business goals (i.e., improved user efficiency through faster responding and more stable systems). (Northern States Power Geographic Information Systems - $1,000,000+ in improvements and replacements)

**Building teams.** Struggling production system for 150+ users: repaired broken customer and vendor relationships and fostered an atmosphere of cooperation that led to rapid stabilization of existing software systems and deployment of new ones. Coordinated people across five departments and two companies. (Northern States Power Geographic Information Systems)

**Independent and accountable.** Formed and led a nearly autonomous group to create, maintain, deliver, sell, and support a commercial off the shelf product. The product became an industry leader with exceptional user support. (Stand-alone communications middleware at Siemens – internal group of 6-8 people - grew the business from no customers to 25 customers and 50 product instances across the world.)

**Technical Contribution.** Led technical discussions associated with the middleware product mentioned above. This resulted in better scheduling, coordination, testing – in general a better product that was easier to maintain and deliver. (Stand-alone communications middleware at Siemens) – Similar contributions have been made in other projects.

**Administers projects/products reasonably and realistically**. Provided timely realistic project schedules that allowed effective coordination of delivery teams and customer teams. Continuous attention to scope, schedule, cost, and quality led to few surprises. (Los Angeles Department of Water and Power SCADA System - $8,000,000 project)

**Sets expectations at appropriate levels and clearly communicates limitations and strengths.** Created a well developed plan and well coordinated delivery efforts that very accurately met customer needs and had about a half year payback. By involving the customer in

decision making throughout the project, project effectiveness and timely acceptance were insured. ($500,000 data synchronization project for a telco)

**A Trusted Leader.** Use of integrity in customer and internal team dealings built trust which facilitated coming to agreement on closure of various aspects of a large project. (Los Angeles Department of Water and Power SCADA System)

***Professional Experience:***

**Software Project Manager (NCLB, Business Intelligence)**
Minnesota Department of Education, Roseville, MN, September, 2004, to the present.

- Providing structured project management to projects and development
- Results include on-time delivery of a complicated web-based system for editing test data.
- Beginning a project to demonstrate business intelligence techniques as applied to test and financial data.
- JAVA, iPlanet, WebLogic, MS SQL Server, MS Project Enterprise, MS Sharepoint Services

**Managing Partner (spatial business intelligence consulting – healthcare and retail)**
IntraCom LLC, Lino Lakes, MN, April, 2003 to September, 2004.

- Applied spatial analysis techniques to solve business problems. – Novel data mining and analysis
- techniques for healthcare and retail settings.
- Project management and product development and application integration consulting.
- ArcGIS, GIS, spatial analysis, MS Access, DICOM, HL7, data conversion/modeling, Windows, SQL

**Project Manager (energy management systems delivery - $100,000 to $8,000,000 value)**
Open Systems International, Plymouth, MN, June 2001 to November 2002

- Supervised contractor efforts to be sure contractual agreements were met on a large ($8,000,000) project.
- Led periodic customer meetings, managed customer perceptions, and refined the definition of deliverables. Known for excellent customer relations and getting things done on time.
- Took on extra responsibilities by offering to close out smaller projects. Succeeded in reaching an agreement on an $800,000 project that provided a way to close out the project. Also spearheaded the delivery of a previously languishing system upgrade to another customer. These actions secured payments that had not been achieved in past efforts.
- Unix, Windows, MS Office suite, MS Project, SCADA, Oracle, high availability, C, SQL

**Manager of the Technical Services Group (outage management systems development and delivery)** CES International, Plymouth, MN, November 2000 to May 2001

- Planned and coordinated work on multiple projects across about 20 resources in four locations. Work included data communications interfaces and GIS data modeling and import.

- Was counted on to resolve problem contracts and to develop technical strategies to streamline development and delivery processes.
- TCP/IP, ICCP, XML, MQSeries, data modeling, C++, outage management, MS Project, GIS

**Project Manager, I/T Applications Services (production GIS environment – 150+ users)**

Northern States Power (XCEL/IBM) Minneapolis, MN, June 1999 to October 2000

- Repaired a broken relationship with a vendor and laid the groundwork for negotiations leading to a warehouse facility and a migration project.
- Planned testing and implementation of upgrades to production systems to minimize impact to users and to increase system stability. Coordinated efforts with vendors, other parts of the IT organization, and management of the system users.
- Created a plan for the actual migration, negotiated key performance aspects of the migration contract. The plan was started while I was there and completed later.
- Directly supervised 5 people, coordinated the efforts of more across 5 departments and 2 companies.
- ArcSDE, ArcGIS, cartography, facility design, data conversion, modeling, warehousing, VB, Unix, Windows, Oracle, OOD, MS Project

**Project Manager (communications middleware – shrink-wrapped solution)**

Siemens Power Systems Control, Brooklyn Park, MN, Feb. 1996 to May 1999

- I took this product from a very immature state to a point where it could be used out of the box to deliver a standard solution with zero variances.
- Built and managed a team of 8 people for development, delivery, and support of a high performance stand-alone data communications product based on an industry standard protocol.
- Delivered presentations for potential customers and user groups internationally.
- TCP/IP, ICCP, C, C++, high availability, SCADA, Oracle, Sybase, MS Dev. Studio, OOD, SQL, MS Project

**Lead Project Software Engineer (large scale data synchronization - $500,000 value)**

Apertus Technologies, Inc., Eden Prairie, MN, May 1994 to February 1996

- Led a team of 5 people in a successful data synchronization project for a telecom company. Customer was pleased by a project payback period of about a half year.
- Data synchronization, C, C++, OOD, Informix, Unix, SQL

***Education:***

Master of Science in Computing and Information Science, Trinity University, San Antonio, TX.

Master of Science in Astronomy, University of Iowa, Iowa City, Iowa.

Bachelor of Arts in Physics and Astronomy, Vanderbilt University, Nashville, Tennessee. (Magna Cum Laude, Phi Beta Kappa)

# TIMOTHY R.VANSICKLE, Ph.D.

Director of State Assessments

## PROFESSIONAL HIGHLIGHTS

Dr. Timothy Vansickle is experienced in high-stakes educational assessment and high-stakes selection and progression testing. He has worked for the American College Testing Program (ACT, Inc.), where he worked on the college entrance test, (AAP), and career planning instruments (CPS, UNIACT). He was instrumental in the development of WorkKeys, as well as other products. In addition, Dr. Vansickle has worked for the Institute of Personality and Ability Testing (IPAT, Inc.) as director of research, and at Riverside Publishing, as director of state assessments and vice president of research and development. In both of these settings, he was responsible for research on and development of assessments, including the 16PF Fifth Edition, the Iowa Tests of Basic Skills and Iowa Tests of Educational Development, The Stanford Binet Intelligence Test, and numerous state criterion-referenced tests (e.g., Washington Assessment of Student Learning, Michigan Educational Assessment Program, Georgia Criterion Reference Test).

Dr. Vansickle serves on the editorial board for Measurement and Evaluation in Counseling and Development (MECD) and has served on the editorial boards of Computers in Human Behavior and College Counseling. He routinely serves as reviewer for proposals for the annual meetings of the American Educational Research Association (AERA) and the National Council on Measurement in Education (NCME). He has extensive knowledge and skills in IRT measurement and standard setting using Angoff and bookmark methods. He is also well versed in job analysis and selection procedures that conform the Uniform Guidelines laid out by EEOC and other government agencies. He has presented and published widely on topics in education, technology, and testing.

## CURRENT POSITION

2004–Present **Director of State Assessments**

**Minnesota Department of Education**

**Roseville, MN**

Provides ongoing leadership and support for test development, psychometrics, and research for the state assessment program. This leadership includes the design and development of the testing program, reporting, research, and special studies required to conduct a large-scale assessment for the state of Minnesota.

**PREVIOUS EXPERIENCE**

2003–2004 **Manager of Research**

**Questar Educational Systems**

**Apple Valley, MN**

Provided pyschometric leadership, test development expertise, and assessment and training support for all of Questar's staff. This leadership included the design and development of testing programs and special studies, primary psychometric consultation for research projects, and representation of Questar on technical committees relative to client activities.

2002–2003 **Senior Psychometrician**

**Data Recognition Corporation**

**Maple Grove, MN**

Provided ongoing pyschometric leadership and support, working with other Research and Test Development staff. This leadership included the design and development of testing programs and special studies, primary psychometric consultation for research projects, and representation of DRC on technical committees relative to client activities.

2000–2002 **Director, Research and Evaluation**

**PPL, LLC.**

**Berwick, PA**

Responsible for all selection and progression testing conducted at the Susquehanna Nuclear Power Plant, including selection exams for technical, maintenance, and operations personnel, as well as progression line exams. In addition, controlled all development, design, and validation of the selection and progression exams. Also responsible

for the training of instructors in the proper use and development of end-of-training exams.

1990–Present **Editorial Board: Measurement and Evaluation in Counseling and Development**

Responsible for the review of research, measurement, and evaluation manuscripts submitted to the journal.

1999–2001 **Vice President and Director**

**Research and Custom Assessments**

**Riverside Publishing**

**Itasca, IL**

Accountable for all research projects and data analysis for the development of national and state norm-referenced and criterion-referenced tests as well as various psychological tests, including the Stanford Binet 5 currently under development. In addition, responsible for the design, acquisition, and implementation of all large-scale assessment and testing contracts and programs. Responsible for the design, development, implementation, and reporting of all research and analysis of test and assessment scores and studies. Also responsible for a multi-million dollar budget and three departments. Oversaw the development and production of all large scale tests and assessments. Managed 18 research, 40 test development specialists, 15 contract acquisition and program management staff, and other production and support personnel.

1999–2001 **Editorial Board: Journal of College Counseling**

Responsible for the review of research, statistical, measurement, and content of manuscripts submitted to the journal.

1998–1999 **Director, State Assessments**

**Riverside Publishing**

**Itasca, IL**

Responsible for all large-scale custom state assessment programs. Duties included the development of assessments, reports, project management, research design, and contract negotiations. Also managed a staff of project managers and coordinated development efforts with respect to state clients. Responsible for budgeting and planning functions.

1993–1998 **Journal Guest Reviewer: Computers in Human Behavior**

1990-1998 **Research Psychologist and Director**

**ACT Assessment, Student Planning and Work Keys Development**

**American College Testing (ACT)**

**Iowa City, IA**

Responsible for the development of operational assessments, reports, and operating procedures for large-scale assessment of generic workplace skills. Responsible for collecting, analyzing, interpreting, and reporting test data. Developed, modified, and analyzed score reports and ancillaries for various tests. Conducted research and developed activities for computer-based tests and interpretations that would aid student academic and career planning.

**Jessie Montaño**

(b)(6)

**Education:**

**Arizona State University**
**BA Education: Major - Elementary Education, 1971**
**Minors - Special Education and Spanish Literature**

**Arizona State University**
**MA Educational Administration, 1974**

**University of Minnesota,**
**Course work completed for Ph. D. in Educational Administration, 1985**

**Work Experience**

**Assistant Commissioner, Office of Teaching and Learning**
**1999 to 2002 Minnesota Department of Children, Families & Learning**
Responsible for staff and programs in the Divisions of Learner Options, Curriculum and Instruction, Statewide Assessment, and Lifework Development.

- Provided leadership and direction to staff in areas of policy development and implementation in standards based reform, the development and administration of statewide assessments, accountability, state programs that provide choices to students and their parents, professional development for teachers aligned to national standards and the Federal No Child Left Behind Legislation.
- Responded to parent and community input and advocated for parental choice on behalf of minority students. Responded to highly sensitive and difficult issues dealing with testing and accountability.
- Presented information to State Legislators, parents, businesses, communities, teachers, students, and administrators through presentations, speeches, and testimony. Represented the Department on numerous task forces and committees and worked closely with the media to ensure that accurate information was reported.

**Accomplishments:** Championed the development of Connecting Learning and Accountability for Students and Schools (CLASS) Web-site that provides data analysis options for all districts and schools in Minnesota. Current and trend data on assessments, as well as demographics on students and staff, and the ability to contrast districts and/or schools are unique features of the site. Initiated the development of the Test of Emerging Academic English (TEAE test), a test that is at the forefront of the accountability requirements for limited English speaking students under Titles I and III under No Child Left Behind. Eliminated silos across Divisions so that staff now work successfully across programs. Staff recognize and respect the contributions each have to offer, and understand through experience, how important this effort is toward providing better services to schools and district staff. Provided leadership to charter schools by ensuring quality choices for parents and students via the application review, approval and monitoring process.

**Manager, Division of Learner Options**
**1995 to 1998 Minnesota Department of Children, Families and Learning**
**Director of State and Federal Programs**
**1992-94 Minnesota Department of Education**
Supervisor of staff and administrator of the following Federal and state programs: Titles I; II; VI and VII; Even Start; Migrant Education; Neglected and Delinquent; Emergency Immigrant; Homeless; Goals 2000; and the Comprehensive School Reform legislation. State programs include: Assurance of Mastery; LEP Education; Compensatory Education; Charter Schools; Enrollment Options; Postsecondary Enrollment Options; Area Learning Centers; Alternative Programs and the Tax Credit and Deduction Program. In years 1992 to 1995, also supervised programs and staff from Secondary Vocational Education and Special Education.

- Implemented Federal and state programs within the goals and policies of the Department and state and Federal laws and regulations; aligned Federal programs that serve the instructional needs of at-risk students with Minnesota's Graduation Standards and Accountability System.
- Influenced the delivery of instructional services to students through the development of state policies and guidelines; prepared state plans and managed internal and external budgets.
- Worked closely with the Council of Chief State School Officers as the Department's Federal Liaison Representative.
- Delivered keynote addresses and workshop presentations at numerous state and federal conferences.

**Accomplishments:** Created collaborative teams among the Federal and state programs in the Division of Learner Options as well as between other programs within the Department. Identified the need for coordination and collaboration between programs serving at-risk students. Initiated the Improving America's Schools Act Consolidated Application using a data based decision making process. Coordinated and cooperated with, and funded curriculum and instructional management systems in four pilot school districts. Influenced the design of Minnesota's statewide testing and accountability program including the definition for Adequate Yearly Progress, and established a support system for schools identified for improvement. Developed Minnesota's State plan for Goals 2000: Educate America Act, the Education Consolidation and Improvement Act, and the Improving America's Schools Act. Significantly increased the amount of federal funds supporting Minnesota Charter Schools. Significantly increased the amount of funds that secondary vocational education received from the Federal Carl Perkins Act and made recommendations on simplifying the state formula for secondary vocational aid.

**Project Director, Postsecondary Enrollment Options Program**
**1985-1988 Minnesota Department of Education**

- Developed policies and procedures for the implementation of the Postsecondary Enrollment Options Program, Minnesota's first "choice" program. Established networks between high schools and postsecondary institutions.
- Provided testimony to the legislature and worked with the Citizens League and the Minnesota Business Partnership to secure the continuation and expansion of the program.

**Accomplishments:** Supervised the program evaluation and wrote the final report which received national recognition at the National Governor's Association and Education Commission of the State's annual meetings in 1987. Authored a chapter entitled "Choice Comes to Minnesota" for the book Public Schools by Choice published in 1989.

**Supervisor, Limited English Proficient Education Unit**
**1978-1988 Minnesota Department of Education**

- Supervised staff and administered the federal Title VII Bilingual Education Act, Title IV National Origin Desegregation Program and the State's Limited English Proficient Education Act.
- Developed policies and guidelines for the implementation of these programs; and provided testimony to the legislature.

**Accomplishments:** Conducted statewide needs assessment on LEP students in Minnesota, which resulted in the successful passage of Minnesota's LEP legislation, in 1978.

**1972-1976 Teacher: Mesa Public Schools, Mesa, Arizona**

- Taught all content skill areas for first, third, and fourth grade students. In my second year, used the whole language approach, in conjunction with the district's phonics curriculum, an innovative teaching approach that resulted in the placement of three student teachers in my classroom. Taught in summer migrant education programs.

**Accomplishments:** Initiated evening programs in the schools for parents and the community. The strong success of this program resulted in the implementation of a district wide community education program.

**Honors and Professional Service**

- Appointed to the Title I Testing and Assessment Panel, National Academy of Science, charged with developing guidance to State and Local Education Agencies on the federal testing and assessment requirements for Title I, 1997
- Appointed to the Independent Review Panel, a federally mandated panel charged with making recommendations to the U.S. Secretary of Education and Congress on the reauthorization of the Improving American's Schools Act, 1995-1998.
- Authored an article entitled "Exciting and Challenging Days Lie Ahead for Those Who Prepare" in the Title I Monitor, 1996
- Recipient of the National Association of Federal Education Program Meritorious Award for Leadership in Addressing the Needs of Students at Risk, 1996
- Represented the Council of Chief State School Officers in the negotiated rule making process for Title I, 1995
- Recipient of an award from the U.S. Department of Education for significant contributions to the Improvement of Compensatory Education, 1995
- Testified before Congress on the reauthorization of Title I, 1994
- President of the National Association of Title I State Directors, 1993-94
- Selected for the Alliance for Renewal in Special Education (ARISE) a professional development organization for administrators, 1988
- Participated in the Minnesota Principal Assessment Center, University of Minn., 1986

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**John Paulson**

Professional experience

6/03 – 10/04 Minnesota Department of EducationSt. Paul, M
Manager, IT Development

1. Responsible for the Minnesota Department of Education Development and support organization, including over 100 data collection, data publication and reporting, and aid and funding payment processing applications.

6/03 – 10/04 BRT, Inc. St. Paul, MN.
Founder, President & CEO

2. Founded Beam Reach Technologies (BRT) with a mission statement of "Facilitating Criminal Justice Information Sharing while protecting the rights and privacy of citizens.

6/94 – 6/03 Ensodex, Inc. St. Paul, MN.
Founder, President & CEO

3. 1994. Founded Ensodex, Inc. USA and secured initial funding. Began development of HotSockets ODBC middleware product.
4. 1995. Recruited Ensodex technical talent and completed HotSockets for ODBC, a middleware-networking product. Incorporated the company and began the initial sales and marketing efforts.
5. 1996. Added to the Ensodex development team and brought the HotSockets product (still being sold) to market. Created multi-platform (Windows and Unix) versions of HotSockets and created initial marketing campaigns.
6. 1997. Led Ensodex to the first profitable year. Increased staff and added Sales & Marketing expertise.
7. 1998. Created additional lines of products. Personally developed the HotSockets for AurthorWare product (still being sold) and directed the development of HotSockets for JDBC product. Created alliance with Metaphase for Professional Services. Acted as project manager for Metaphase Product Life Cycle Management Development team. Created HotSockets sales channel with HotSockets for JDBC shipping with each Unisys ClearPath platform. Created the SQLBridge product used to link ODBC and IBM MQSeries middleware systems for increased EAI integration. Led Ensodex to increased profits and revenue.

8. 1999. Developed the Architecture and directed the Ensodex development team to create a product for Metaphase called "Accelis". Accelis is the first Composite Application Framework tool focusing on taking EAI to the next level. A configurable business logic layer with flexible legacy system connectivity. Delivered this product to Metaphase. It was completely developed in house at Ensodex and is currently being marketed by EDS as "TeamCenter Collaborator". Created professional services organization dedicated to Ford Motor Company and opened the Ensodex Dearborn office in Detroit, MI. Operated as a pre-sales consultant for Metaphase selling Accelis at Boeing, Ford, Rockwell, Lockheed, Motorola, Genmar, Matra BAE (France), Nokia (Sweden) HP, IBM, Johnson Controls, and many others.
9. 2000. Developed the Architecture and directed the Ensodex development team to create the Ensodex Tupelo Composite Application Framework product. Tupelo allows hardened security and pre-configured business logic to be executed against corporate legacy system. B2B, B2C and EAI can be installed and configured, rather than developed. A multi-platform J2EE product, Tupelo is now in production at Ford Motor Company for Tool Supplier integration. Expanded the Ensodex development staff and created Ensodex Europe SAS located in Paris, France. Ensodex Europe SAS is a wholly owned subsidiary of Ensodex, Inc. USA. Led Ensodex USA and Ensodex Europe to profitable year-ends.
10. 2001. Expanded Ensodex USA and Ensodex Europe to a total of over 55 people with revenue in excess of $4.5M. Directed by the Ensodex Board of Directors to transition Ensodex away from services to pure product company by end of 2002. Provided technical vision to product development focusing on WebServices, additional GUI design functionality. Worked with Sales & Marketing to develop new presales demonstrations and collateral for Tupelo CAS focusing on Financial Consolidation, Multi-site HR systems, and Corporate Intelligence Services. Directed Ensodex development to define and schedule the release of Tupelo Composite Application Server, allowing greater EAI and Collaboration solution power from pre-configured components.
11. 2002. Continuing the Ensodex transition away from integration services to a pure product company. Engaged Investment Bankers, created the Ensodex business plan and technology vision to take to the capital markets. Expanded and strengthened the Ensodex board of directors and the Ensodex management team. Streamlined costs to react to market contractions.
12. 2003. Implemented the orderly shutdown of Ensodex in response to market conditions affecting IT consulting and software sales. Negotiated contract terminations.

6/90 – 6/94 Unisys Corporation. St. Paul, MN.

Department Manager, Database Systems Development

13. Software development manager in charge of database systems for Unisys with offices in St. Paul, MN, Los Angeles, CA., and Sydney Australia. In that capacity I oversaw the architecture design, development and release strategies of the Unisys mainframe database systems of Unisys 2200 Relational Database Management System (RDMS), and the Network based management system Unisys A-Series DMS. Also during that time, I was lead architect and development manager in charge of creating the Griffin database system for Unisys. This system is a high performance multi-platform relational and object database system. All of these products are still in production at Unisys, a leader in OLTP database solutions.

1985 – 6/90 Unisys Corporation. St. Paul, MN.

Manager

14. Responsible for directing a group of system software developers for various internal Unisys IT projects. Projects included installation software for Unisys system software, production software for automated Just In Time software media creation, and programmer development frameworks and tools.

1981 – 1985 Unisys Corporation. Clear Lake, IA.

System Programmer

15. Worked as a system programmer on various Unisys system software projects including Expert System development and Artificial Intelligence systems, software distribution systems and software release management systems.

Education

1980 University of Iowa Iowa City, IA

M.S. Computer Science

16. Awarded Teaching Research Fellowship of the Computers Science Department
17. Instructor of Record Cobol, Computer Science Department
18. Instructor of Record Fortran, Computer Science Department

1977 University of Iowa Iowa City, IA

B.S. Honors in Psychology

19. Honors for Research in Operant Conditioning.

**Catherine Ryan Wagner**

(b)(6)

(b)(6)

**PROFESSIONAL EXPERIENCE**

***Minnesota Department of Children, Families & Learning***
**Information Technologies Education Director**
August 2003 – Present

- Supervise the coordination and implementation of data collection and evaluation activities for MDE student and staff data
- Supervise the streamlining of data acquisition activities for effective use of resources
- Supervise the development of data collection standards to meet new state and federal requirements and special data collection projects
- Supervise the mainframe and micro-web applications development projects
- Supervise an IT staff of 40 on core technology teams including mainframe developers, micro-web developers, data applications developers, network/help desk specialists and the project management team
- Problem solve daily activities in the Division of Information Technologies
- Serve as agency liaison to national and state accountability and data organizations
- Train state superintendents and principals on data requirements and data collections required for new federal AYP regulations
- Present legislative testimony in the areas of data collection activities related to NCLB AYP and the State report card
- Coordinate the commissioner's working group on current data collection activities
- Develop processes to prioritize agency data requests based on availability of resources
- Clarify reporting directives from United States Department of Education, the National Center for Educational Statistics and the Office of Civil rights

**Accountability Specialist**
August 2000- August 2003

- Planned and directed research and analysis for the design and development of the State NCLB accountability system
- Authored major Federal reports and winning grant proposals
- Coordinated the design and development of data acquisition and management procedures for the implementation of NCLB accountability requirements
- Provided leadership and motivation for staff in developing critical collaboration between assessment and Title I to establish statewide accountability system
- Planned and directed research procedures for evaluating school performance
- Used in-depth knowledge of organizational development to design continuous improvement processes for urban schools
- Researched State and Federal statutes to develop school improvement policies for low performing schools
- Researched State education statutes and Federal Title I statutes to design and implement data collection activities for the State and federal NCLB report cards

- Developed components for data analysis and evaluation of student work
- Provided staff development for implementation of school improvement activities in low performing schools in major urban school districts in the state
- Collaborated with the University of Minnesota's Office of Educational Accountability to establish indicators for statewide accountability and continuous improvement
- Designed the State school improvement web site CLASS
- Managed contractors in data management and web development

**Statewide Testing Coordinator**
1996-2000

- Designed, established and coordinated statewide testing programs in reading, mathematics and writing for the Minnesota Comprehensive Assessments and the Basic Standards Tests
- Designed, established and coordinated standards-based statewide testing program for English language learners in reading, and writing; Minnesota Test of Emerging Academic English
- Managed a range of test administrators, item writers, and testing personnel
- Managed 10 million dollar annual budget of testing contracts with multiple testing vendors
- Established appropriate accommodation and inclusion guidelines for special populations including special education students and student with limited English language proficiency
- Presented legislative testimony in the areas of statewide testing including Title I assessments and basic skills tests
- Participated in media events (press, radio, television) to provide information on statewide testing
- Presented at major national and state professional conferences on statewide testing
- Provided leadership to create staff development materials related to statewide testing programs
- Coordinated Title I and statewide assessment activities
- Provided leadership and conducted staff development activities for the implementation of the statewide assessment programs

**PROFESSIONAL EXPERIENCE continued**
***Minnesota Department of Children, Families & Learning***
**Graduation Standards Coordinator**
1994-1996

- Coordinated teams of teachers and curriculum experts K-12 and post secondary to develop K-12 content standards in 10 curricular areas
- Assisted with the implementation of the state content standards and the development of curricular and instructional supports
- Researched international, national and state curriculum standards

***Blaine High School, Blaine Minnesota***
***Northdale Junior High, Coon Rapids Minnesota***
**French Teacher**
1976-1994

- Taught French grades seven through twelve
- Created instruction and assessment activities focused on student centered and applied learning
- Designed standards-based grading methods
- Provided training on authentic assessment techniques in second languages
- Chaired four period day committee
- Designed a peer coaching system used in conjunction with the Teacher Performance Review System
- Provided input on building level budget decision as chair of site-based finance committee
- Served as department chair
- Chaired North Central Evaluation teams
- Planned and coordinated district-wide in-service sessions

**Education**

Completed course work at the University of St. Thomas, St. Paul MN
Education Administration Specialist, 1998

Master of Education, University of Minnesota, Minneapolis, MN
Educational Leadership, 1994

Bachelor of Science, University of Minnesota, Minneapolis, MN
Education Major, 1976

Study Abroad at the Universite de Paris, Sorbonne, 1975

**Professional Memberships**

American Educational Research Association
Association for Supervision of Curriculum and Development
CCSSO Accountability Systems and Reporting Consortium (ASR SCASS)
CCSSO Comprehensive Assessment Systems for IASA Title I (Title I SCASS)
Minnesota Assessment Group
Minnesota Teachers of English to Speakers of Other Languages, MinneTESOL
National Council on Measurement in Education

# PATRICIA D. OLSON

(b)(6)

Work: (651) 582-8856

*PROFESSIONAL HIGHLIGHTS*

Dr. Patricia Olson contributes over ten years of experience managing all aspects of large-scale assessment projects. Her experience includes planning, designing and developing innovative testing programs; implementing psychometric services; technical assistance; and delivering products and services to clients.

Dr. Olson began her career as an educator, serving as a classroom teacher for 14 years, then as an adjunct professor, teaching graduate-level courses in Educational Measurement, Statistics, and Research Methodology. In addition to her teaching experience, she has authored several educational publications, presented at the American Educational Research Association and other conferences. Dr. Olson earned a Ph.D. from the University of Florida.

*CURRENT POSITION*

2003–Present **Assistant Commissioner of Academic Accountability and Improvement**
**Minnesota Department of Education**
**Roseville, MN**

Responsible for oversight and management of the divisions of all federal educational Title Programs and Assessment and Testing. This includes working with educators, stakeholders, and subcontractors; defining vision for the office responsible for carrying out the accountability goals of No Child Left Behind (2001); monitoring division goal progress and budgets; and evaluating and assigning staff.

Specific responsibilities include: supervising division managers and key leadership personnel; providing leadership in planning, designing and developing innovative accountability program for all Minnesota students; monitoring the psychometric and technical aspects of all statewide assessments; providing leadership in process improvements and research efforts; recruiting new associates; determining staff training needs; and conducting performance appraisals.

*PREVIOUS EXPERIENCE*

2002–2003 **Director, Assessment Services**
**Data Recognition Corporation**

Responsible for definition, management, and delivery of services for new statewide educational assessment projects. This included working with clients, subcontractors, and vendors; defining specifications; negotiating contracts; monitoring project progress and costs; coordinating project team assignments; developing and printing project materials; establishing customer service systems; and evaluating and assigning staff.

Specific responsibilities included: supervising Project Management Team; providing leadership in planning; designing and developing innovative assessment programs; serving as Lead Psychometrician for selected clients; collaborating with the Psychometric Services department; preparing required documentation and technical reports; providing leadership in process improvements within the client organization; recruiting new associates; determining staff training needs; and conducting performance appraisals.

2000–2002 **Director, Psychometric Services**

**Data Recognition Corporation**

Implemented and managed all aspects of psychometric services for Research and Test Development's (RTD) educational assessment projects. Supervised, evaluated, and developed department staff. Collaborated with Team Leaders in Professional Development, Item Development, and Psychometrics to support RTD's goals and obligations.

Specific responsibilities included: supervising the Psychometric Services project team; providing leadership in planning, designing, and developing innovative assessment programs; preparing required documentation and technical reports for clients; serving as a resource on client psychometric issues; and collaborating with both the Vice President and the Research and Consultant Team Leader.

1999–2000 **Project Team Leader, State Assessment Programs**
**Data Recognition Corporation**

Responsible for managing all aspects of the delivery of products and services to clients, including administering contracts, scheduling resources, tracking costs and monitoring the budget, meeting project deadlines, and achieving overall client satisfaction for state projects.

1998–1999 **Project Director, Educational Services**
**Data Recognition Corporation**
Responsible for management, coordination, information handling, and data collection activities for Louisiana project to ensure customer satisfaction. Directed staff on data management design, reporting, and quality control requirements in addition to serving as key customer, vendor, and company contact.

1998 **Project Coordinator, Educational Services**
**Data Recognition Corporation**
Acted as client liaison. Monitored vendors' performance and prices. Designed, edited, and proofread manuals, test booklets, scannable answer sheets, and other materials related to testing projects. Designed report forms and developed reporting specifications. Verified answer keys. Developed specifications for distribution and collection systems, and data analyses. Monitored project status, budget, distribution and collection systems, and printing production.

1997 **Assistant Director, Professional and Occupational Services Program**
**ACT**
Responsible for all phases of test development for Automotive Services Excellence (ASE) certification tests. Served as client liaison. Monitored project status and budget. Maintained project documentation: specifications, procedures, printed materials, and report samples. Verified answer keys. Conducted pass score studies. Verified equating and setting of standards. Developed costs for development of new tests. Verified maintenance and integrity of item bank.

1994–1996 **Research, Evaluation, and School Improvement Specialist**
**Florida Region III Title I Technical Assistance Center**
Provided technical assistance on assessment and evaluation issues to nine districts. Assisted districts and schools with interpreting assessment data and using data in writing school improvement plans. Conducted training workshops and seminars on assessment and evaluation issues for district and school personnel. Assisted districts with writing project plans to comply with federal and state requirements.

*PROFESSIONAL AFFILIATIONS*

American Educational Research Association (AERA)—1990–Present

National Council on Measurement in Education (NCME)—1990–Present

**PAPERS AND PUBLICATIONS**

"Incorporating Test-Taking Skills into the Elementary and Middle School Curriculum," paper presented at Florida Region III Title I School Improvement Conference (Orlando, FL, July 1996).

"Understanding Your Child's Test Scores," paper presented at Florida Region III Title I Parent Involvement Conference (Orlando, FL, February 1996).

Spence, P. D. & Miller, M.D., "Confirmatory Factor Analysis of Dichotomous Variables," paper presented at the annual meeting of the American Educational Research Association (Boston, MA, April 1990).

Spence, P. D. & Miller, M. D., "Equating with Multidimensional Data," paper presented at the annual meeting of the Florida Educational Research Association (St. Petersburg, FL, November 1995).

*EDUCATION*

**University of Florida**

Gainesville, FL

Ph.D., Educational Evaluation and Research Methodology

**University of Central Florida**

Orlando, FL

M.Ed., Educational Administration and Supervision

**University of Central Florida**

Orlando, FL

B.A., Elementary Education

# *Curriculum Vitae*

## Heather R. Britt

(b)(6)

**Work**

Minnesota Department of Education
1500 Highway 36 West, Roseville,
MN 55113
heather.britt@state.mn.us (e)
651-582-8452 (p)

**Education**

Ph.D., Epidemiology, September, 2004
University of Minnesota School of Public Health, Minneapolis MN
M.P.H., Health Behavior and Health Education, May 1998
University of North Carolina School of Public Health, Chapel Hill NC
B.S., Biology, May 1993
Cornell University College of Agriculture and Life Sciences, Ithaca NY

*Employment History*

**Prevention Research Scientist** April 2004 - Present
Minnesota Department of Education, Roseville, MN

*Directing the development and administration of results measurement activities for Safe and Healthy Learner's state and federal programs in youth development; out-of-school time programs; prevention initiative relating to substance abuse, violence, and health promotion; and school/community collaboration. Directing the development and provision of training sessions on results measurement for both internal and external personnel. Leading the development and implementation of results measurement policies and procedures. Ensuring the provision of consultation and technical assistance to educational personnel, other youth-serving community agencies, and other public agencies in the design of appropriate outcomes, progress measurement and other impact measurement.*

**Senior Research Analyst** July 2002 - March 2004
The Urban Coalition, Minneapolis, MN

*Development and identification of research needs and priorities of communities of color and low-income white communities. Conduct primary and secondary quantitative and qualitative community-based participatory research studies as necessary, including designing studies, marshalling resources, collecting and analyzing data and reporting. Provide evaluation of all internal and external programs and projects. Maintain working relationships with researchers and planners in government, education and human service organizations. Develop ways to increase research and advocacy capacity of communities. Provide research assistance, data gathering support and technical assistance to staff and communities. Prepare peer-review articles, presentations, op-ed and newsletter articles.*

**Graduate Research Assistant** Sept 1998 - June 2002
Alcohol Epidemiology Program, University of MN School of Public Health
*Contributing researcher in federally-funded community trials evaluating alcohol policy changes. Coordination of intervention with law enforcement and community members. Involvement in data collection, data analysis, interpretation and reporting. Participation in community task forces and political process meetings. Development of media materials and fact sheets regarding alcohol policy.*

**Summer Exchange Fellow** June 2000 - Aug 2000
Center for Alcohol and Drug Prevention, Karolinska Institute, Stockholm Sweden
Involvement in data cleaning, analysis and interpretation. Participation in prevention policy discussions and debates. Development of manuscript for publication.

**Graduate Research Assistant** Aug 1996 - May 1998
Health Communications Research Laboratory, UNC-CH School of Public Health
*Participation with research teams on projects involving osteoporosis, cancer and smoking behavior. Involvement with research design, data collection, data analysis and report writing. Project Coordinator for a small grant. Participation in team building and processing.*

**Junior Research Analyst** Nov 1994 - Aug 1996
American Academy of Physician Assistants
*Participation in data collection, preparation, analysis and report development. Coordination of special projects and surveys including PA specialty surveys and health research interest roundtables. Development and monitoring of annual division and contract budgets.*

**Membership and Continuing Education Coordinator** Aug 1993 - Oct 1994
National Society of Professional Engineers
*Management of newly registered recruitment program. Development of computerized record keeping and accreditation service for continuing education providers. Implementation of special activities including leadership functions and general membership meeting events.*

*Consulting Experience*

**Evaluation Consultant** March 2000 - March 2004
Association for Non-Smokers Minnesota, Minnesota Department of Health (MDH)
*Participation in development of logic model for two MDH funded tobacco prevention programs. Facilitation of program component development. Development and implementation of evaluation plan Involvement in data collection, data analysis, report writing, and grantee-grantor communication.*

**Analysis Consultant** Jan 2001 - Dec 2001
Minneapolis Department of Health and Family Support
*Performance of analysis examining effect of individual and neighborhood income on various health outcomes. Development of segments of city report. Draft of portions of city council briefs.*

**Community Consultant** Aug 1996 - May 1997
City of Goldston, North Carolina

Department of Health Behavior & Health Education, UNC-CH School of Public Health

*Participation with a student team in gathering primary and secondary data on a small community in rural North Carolina. Involvement in needs assessment and gathering of asset information. Performance of qualitative interviews with residents and development of a community forum.*

**Reports**

- The Urban Coalition [Britt, HB]. *balancing worlds: Voices of Adolescence: Focus Groups with Teenagers in the American Indian Community and Communities of Color.* Jan 2004.
- The Urban Coalition [Britt, HB]. *Facilitation and Development of the Participatory Research Partnership: Final Report to the Allina Foundation and the University of Minnesota School of Public Health.* Dec 2003.
- University of Minnesota State Health Access Data Assistance Center, Stratis Health, The Urban Coalition [Britt, HB] and Community Researchers. *Disparities and Barriers to Utilization among Minnesota Health Care Program Enrollees: Final Report.* Dec 2003.
- The Urban Coalition [Britt, HB] and the YWCA of Minneapolis. *Leadership Registry Research Report—One Component of the Racial Justice Initiative.* September 2003.

**Publications**

- *Britt, HB, Carlin, BP, Toomey, TL, & Wagenaar, AC. Neighborhood-level analysis of the spatial relationship between alcohol outlet density and assaultive violence.* Environmental and Ecological Statistics. *Accepted for publication.*
- *Britt, HB, Kilian, G, Toomey, TL, & Wagenaar, AC. Alcohol establishment owner and manager perspectives on recruitment, training methods and content of responsible beverage service programs. To be submitted*
- Britt, HB, Toomey, TL, Dunsmuir, W, & Wagenaar, AC. Propensity for and correlates of alcohol sales to underage youth. *Journal of Alcohol and Drug Education.* Submitted.
- Britt, HB, Romelsjo, A, & Branting, M. Evaluation of the prevention paradox using Swedish adolescent alcohol data. *Scandinavian Journal of Public Health.* Submitted.

**Fellowships and Honors**

*Final Candidate, Post-Doctoral Fellowship*
*March 2002*

*Kellogg Foundation Community Based Participatory Research Program*

*Pre-Doctoral NIH Training Grant Fellowship* *January 2001 - June 2002*

*Behavioral Aspects of Cardiovascular Disease*

Delta Omega National Public Health Honorary Society — Inducted Spring 1998
University of North Carolina School of Public Health

Employee Achievement Award — Sept 1995
American Academy of Physician Assistants

Nabisco National Scholar in Agriculture and Life Sciences — Sept 1989 - May 1993
Cornell University Tuition Scholarship

**Professional Associations**

| | | |
|---|---|---|
| Public Health Student Caucus | | |
| | Chair, Advocacy Committee | Jan 200 |
| | Member | Jan 199 |
| American Public Health Association, Member | Dec 1996 - Present | |
| Minnesota Public Health Association | | |
| | Co-Chair, Membership Committee | March |
| | Member | Sept 19 |

**Brian Hecht – SENIOR Software Architect**

## Professional Summary

I have over 20 years of product development experience and a proven track record as a technologist and leader in the software industry. My recent focus has been on:

- J2EE
- Enterprise Application Integration.
- Web Services

I not only understand the technology, but also the business requirements that drive a solution, and how best to exploit the technology to address the business needs.

I am versatile enough to be able to perform project development, project leadership, project management, relationship management, and pre-sales activities.

## Technical Experience

**10/04 – Senior Architect, Minnesota Department of Education**
Agency information technology architect, responsible for information publication, security, and overall information systems design and support architecture.

**7/04 – 10/04 (BRT, Inc.)**
*Developer* for creating automated tests for web access to handheld devices:

- Automated the testing of MS Exchange Servers and Notes servers synchronization with handheld devices over the internet using the TestQuest Pro product

**5/04 – 7/04 (BRT, Inc.)**
*Lead Developer* for the Criminal Justice Application Dashboard, which allows Business Analysts to set and implement security policy for data access. This included:

- Working directly with the customer gathering requirements and incorporating the feedback into deliveries
- Designing the J2EE application relying heavily on open security standards such as XACML
- Implementing the business logic using the Tupelo integration framework
- Creating the GUI in HTML/Javascript

***Contact Information***
***Brian Hecht***
***1620 Oak Ave***
***Arden Hill, MN 55112***
***bhecht@visi.com***
***651-303-4737***

### *Areas Of Expertise*

#### *TECHNICAL SKILLS*

- Unix/Windows Development
- J2EE, EJB, WebServices
- Object-Oriented programming
- HTML, XML, DOM, WML
- XACML, SAML
- Java, Swing, JDBC
- Servlet API/JSP, Javascript
- C/C++, Cobol, Motif, SNAP
- Mozilla, IE
- CVS, ClearCase, VSS, Subversion, COMUS
- Ant, Struts, Cocoon
- TestDirector, JMeter, TestQuest Pro, JUnit, HttpUnit
- Netegrity, RSA, Java Realms
- Oracle, SQL Server, MySQL
- UML, RUP, Multiple Design Patterns

#### *TECHNICAL ENVIRONMENTS*

JBOSS, WebSphere, WebLogic Application Servers, Tomcat, Apache,
Sun One LDAP , OpenLDAP servers
UNIX (Solaris, HP-UX, Linux)
MS Windows 95/98/NT/2000/CE/XP, Mainframe, Eclipse

#### *BUSINESS SKILLS*

- B2B, B2C, EAI, Composite Applications
- Customer Relationship
- RFP Response Author
- Public Speaking
- Training

#### *EDUCATION*

**University of St. Thomas**

**1/04 – 5/04 (BRT, Inc.)**
*Technical Lead* of a team of three developers that defined and provided a Development

Environment for the CriMNet project at the State of Minnesota. This included:

- Specification of an IDE, Source Control System, Bug Tracking Software
- Defining Development Processes and Methodology for CriMNet
- Creating a training course for the CriMNet Development Process
- Evaluating, selecting, and implementing a regression test package
- Defining a DMZ for the CriMNet application to enhance the security

**8/03 – 1/04 (BRT, Inc.)**
*Lead Developer* for the integration of the automated test tools, Test Director and

TestQuest Pro with Microsoft Visual Source Safe. Specifically:

- Created COM/DCOM modules
- Used ODBC for data access
- Coordinated activities with India based development team

**6/03 – 10/03 (Ensodex, Inc.)**
*Technical Lead* for enhancing security in the State of Minnesota's CriMNet project.

- Installed, Configured, and Customized of the Netegrity Policy Server and the RSA Ace Server
- Integrated the Sun ONE LDAP server and the JBOSS application server
- Replaced the Java Realm security with Netegrity
- Integrated the new authorization code in the CriMNet integration framework

**2/02 – 6/03 (Ensodex, Inc.)**
*Technical Lead* of the Accelicare J2EE EAI application using the Tupelo integration framework:

- Worked directly with the customer gathering requirements for the Bed Management component
- Used statistical analysis to create the business logic for the Forecasting component
- Designed and implemented the Oracle database for the Scheduling component
- Designed the implemented the security module that allows Payers to safely access the system

**1/01 – 2/02 (Ensodex, Inc.)**
*Technical Lead and Architect* for various features of the Ensodex EAI framework (Tupelo) including:

- Implemented Web Services on both the front end and back end
- Created the Database and LDAP based Login Services
- Designed and implemented the component based security model.
- Implemented XML based GUI development environment with HTML based Wizard access
- Implemented Mainframe integration component.

**7/99 – 1/01 (Ensodex, Inc.)**

*Technical Lead* of the MetaCatalog project. This project was an integration of the SDRC Metaphase product with the i2 Aspect product. Responsibilities include:

- Liaison between the two companies.
- Overall architecture and design
- Specific java module implementation
- Overseeing the technical work of five developers

**7/97 – 12/01 (Ensodex, Inc.)**
*Lead Developer* of various projects for Ford Motor Company.

- Performed Project Management for a team of five developers.
- Responsible for overall design of the Java based projects
- Responsible for coding specific modules for the projects

**12/96 – 7/99 (Ensodex, Inc.)**
*Developer* on the SDRC e!Vista integration toolkit project. This work involved design and implementation of a Java based toolkit for accessing the Metaphase PDM system.

Developed and taught a training class for e!Vista. This class included both instruction and labs so customers could learn in a hands-on interactive fashion.

***Business Experience***

## BRT/Ensodex, Inc. CTO

**6/94 – Present**
*CTO*

- Provided technical direction for the development of the Ensodex suite of products including Tupelo and the HotSockets family of products.
- Authored various technical RFP responses.
- Created and delivered several Tupelo technical pre-sales presentations.
- Prepared technical responses to competing technologies
- Architected the HotSockets family of products.
- Advised Ford and EDS on Web based delivery of applications and Java technology.

Served on the Board of Directors for Ensodex, Inc. Provided technical direction for the company, along with a

concrete plan on how to exploit the technology for business value.

**1/01 – 9/01**
*Relationship Manager, Technical Lead, Designer and Implementer* of the Ford VTTO B2B application. This was a J2EE application developed for Ford on a fixed price basis. Along with some of the design and implementation, I was required to balance the workload of 15 developers to meets Ford aggressive delivery schedules without going over budget.

**Dan McCreary**

(b)(6)

**Summary**

An executive-level technology evangelist with a strong track record of creating highly profitable technology service organizations. A rare combination of technology understanding and excellent strategy development and presentation skills.

**Experience**

**Dan McCreary & Associates** - *October 2001 to Present*
**Technology Strategy and Consulting**
Independent contractor specializing in assisting organizations evaluate advanced technologies. Leveraged strong technology industry contacts, strong technology reputation and knowledge of advanced technology areas. Focus on e-Business strategy development.

From January to present I have been serving as a Data Architect at the Minnesota Department of Education. My roles have been to create standards for Data Dictionaries, publish a web site of Data elements and to document the relationship of Minnesota State Data Dictionary standards such as ISO-11179, CWM, NCES, NIEM, EDEN and SIF metadata standards. I also create ant build processes that use XMLT 2.0 transformation to convert XML Data Element definitions into HTML for web publication as well as create conversions to OWL and CWM formats. These standards have been developed with state vendor-neutral specifications in mind. In addition I have created standardized training materials on the creation of Data Stewardship teams as well as the use of Data Dictionaries in longitudinal Data Warehouse activities that use conformed dimensions based on the Kimball data warehouse methodologies.

From May of 2002 to January of 2005 I was been involved on one of the most ambitious efforts to integrate computer systems in the state of Minnesota. The CriMNet project objectives were to provide statewide standards and systems for securely exchanging data between over 1,100 computer systems. My role in this project included the use of EAI, JMS, XML, XML Schemas, XSLT, SVG, XPath, GJXDM (a large Data Dictionary), ISO-11179, Web Services, JBoss, UML Modeling, Apache Ant, XDoclet, Model-Driven-Design, Eclipse, PKI, SOAP Headers, WS-Security, Web Service Encryption and Digital Signatures. I also spent considerable time developing training materials for both programmers and managers in many of these areas.

**NetSource America** - *April 2001-October 2001*
**Director of Marketing**
Director of Marketing for new startup involved in network design and management services. Created industry positioning, designed and developed service offerings, designed marketing materials, managed web site and created proposals for new business. Created plans for XML Web service integration.

**Dan McCreary and Associates** - *Oct. 2000-April 2001*
**President**
Independent consultant specializing in e-Business strategy development. Created technology strategies for small to medium customers in the health care and telecommunications industries.

**LarsonAllen** - *Jan. 1999-Oct. 2000*
**Principal/CIO**
Created a Web-centric strategic technology plan for $70 million accounting firm. Directed strategic technology projects. Investigated opportunities for creation of new services around an Application Service Provider (ASP) business model for the healthcare industry. Served as principal e-Business consultant for LarsonAllen customers. Created e-business strategies for LarsonAllen customers.

**Integrity Solutions/KeyTech** - *June 1992-Jan. 1999*
**Founder, President, Owner**
Created new software services company focusing on advanced multi-tier object oriented application development technologies. Built company from startup to over $6.3 million in sales revenue. Transformed company into one of the Midwest's leading Internet and Web application development organizations. Ranked as the 37th fastest growing company in Minnesota by City Business.

**Boss Logic, Inc.** - *January 1990-June 1992*
**Manager, Custom Software Development, Account Manager, Systems Engineer**

Created new business unit to manage professional services for Sybase document management company. Built business unit from startup to over $3 million in annual sales. Developed relationship with vendors, partners and managed a national customer base.

**NeXT Computer, Inc.** - *October 1988-January 1990*
**Systems Engineer, Technology Sales, Technology Training, Technology Evangelism**
Served as one of NeXT's first field system engineers. Worked with Steve Jobs to create sales and training materials for NeXT. Developed an extensive training and classroom materials for teaching business benefits of object-oriented technologies.

**ETA Systems** - *1985-1988*
**Software Manager/Software Engineer**
Managed 14 people involved in developing technology to support supercomputer operating system development. Managed budget of $3.1 million in native UNIX operating system development for ETA supercomputers.

**AT&T Bell Labs** - *1983-1985*
**Member of Technical Staff**
Created software applications to manage the design of VLSI CMOS integrated circuits. Software tools included high level design, simulation, layout, design checks, compaction and verification. Led the transition from FORTRAN/VMS software system to C/UNIX systems.

**Education**

Carleton College, Northfield, MN - B.A. - Physics/Computer Science, 1982
University of Minnesota, Minneapolis, MN - M.S. Electrical Engineering/Computer Science, 1983
University of St. Thomas, St. Paul, MN - M.B.A. (to be completed in 2004)

# LIANGSHENG CHENG

(b)(6)

## CAREER EXPERIENCE

*Team Lead of Software Applications, MN Dept of Education, St. Paul, MN (September 2003-Present)*

1. Worked as a technical lead/architect and designed/developed a Minnesota Teacher Recruitment Center (MTRC) J2EE system using a role-based custom security framework, J2EE, JavaMail, Struts, design patterns, Log4J, Ant, stored procedures, Rational Rose, Iplanet, Weblogic, and SQL2000 server.
2. Designed and developed J2EE applications for No Child Left Behind (NCLB) system using J2EE, Struts, JSTL, Log4J, Ant, stored procedures, Iplanet, Weblogic, and SQL server.
3. Led a team of 6 developers to maintain and enhance various J2EE applications for the entire agent.
4. Participated in the hiring and interviewing process for all technical positions, made recommendations on new technologies, and developed technical standards.
5. Provided mentoring to developers working on OOAD, design patterns, iterative development process, Struts, and various custom frameworks and conducted design and code review sessions in order to share expertise with team members.

*Senior Software Engineer/Architect, Consultant, St. Paul, MN (August 2001- August 2003)*

6. Designed and developed a web-based application in a paperless workflow system for processing long-term health care applications, claims, and correspondences using Java, J2EE, Log4J, Java Mail, stored procedures, Tomcat, JRUN, and SQL server.
7. Developed a datafeed application and automated its process to produce a datafeed file specified by a client using VB, stored procedures, DTSs, executable scripts, and SQL job.
8. Identified system requirements, created a prototype user interface, developed a transactional database model, and designed and implemented a web-based scheduling and billing software system using Java, Struts, JSP, Servlet, JavaBean, JDBC, JavaScript, HTML, and SQL server.

9. Developed a membership management web system using J2EE, Java, XML, UML, Rational Rose, JavaScript, CSS, and HTML and deployed it on LDAP, Apache, Tomcat, Weblogic, and database servers.
10. Designed an error logging system using object-oriented design patterns.
11. Conducted software builds using Ant and performed unit testing and integration testing during application development.

*Senior Software Engineer, Firepond Inc., Bloomington, MN (August 2000-June 2001)*

12. Developed a multimillion-dollar complex software system for an aircraft company, including an Interactive Sales System (ISS) for direct sales force and Opportunity Management System (OMS) for sales management system using Java, XML, XSLT, JavaScript, HTML, CSS, UML, Rational Rose, SilverStream, and relational databases.
13. Designed and developed an OO framework for multi-process applications using socket and multi-thread programming.
14. Performed an integration programming on the two enterprise software packages, i.e., ISS and OMS, and conducted unit testing and integration testing on them.
15. Responsible for software builds during the later stages of software releases using the Firepond standard software build process including batch process, compiling process, and bundle process.

- Provided mentoring to developers working on OO programming and Java and conducted project demos and code walk-through sessions in order to share expertise with team members.

*Programmer Analyst, C.H. Robinson Worldwide, Eden Prairie, MN (September 1999-August 2000)*

- Worked with users and customer service to identify business needs and define software requirements on a complex national fuel tax management system.

16. Led a team in a relational database design and data modeling for the fuel tax management system, including ER diagram, data integrity, relational schema, domain model, and database creation.

- Designed and developed, as a technical lead, a web-based Internet application based on the fuel tax management database using Java, JSP, Servlet, JavaScript, HTML, and SQL stored procedures.
- Developed applications to process alive transaction data from SQL server for logistic and transportation industry using VB, stored procedures, ActiveX, and COM.
- Wrote SQL code and DTS packages for converting legacy data to a relational database and developed application reports using Crystal Reports to retrieve the data on the database.
- Led programmers/developers in a team environment and provided technical consultation for users.

*Software Engineer, Worldtrak Corporation, Bloomington, MN (March 1999-September 1999)*

- Implemented a web-based enterprise software package for Customer Relationship Management (CRM) system using ASP, Java, HTML, JavaScript, CSS, VBScript, and SQL.
- Developed a metadata management application for managing and mapping different data models using VB and SQL server.

17. Developed a synchronization server for synchronizing data on SQL server and Exchange server.

18. Conducted the product release testing for different products.
19. Performed the evaluation of a commercial database replication tool and identified issues.

*Research Associate, Research Assistant, University of Minnesota, MN (December 1991-March 1999)*

- Conducted research on merging materials and developed a novel indentation mechanics model that is now used by indentation research community to characterize mechanical properties of thin films in nanoindentation tests.
- Designed, developed, and deployed engineering application software through all software development phases for analyzing three-dimensional nonlinear contact problems on both UNIX (including Sun, SGI, IBM, and Cray) and Windows platforms.

20. Developed a graphical user interface for pre- and post- processing of large-scale computer simulation of engineering applications using C.

- Integrated the developed computation engine software with the visualization software packages using C++ to present the computerized simulation to end-users.

*Research Engineer, Hohai University, Nanjing, China (July 1986-September 1991)*

- Conducted research and taught undergraduate and graduate courses in computer modeling and computational mechanics.

Developed engineering software packages for mechanical and civil engineering applications and participated in all phases of software development, i.e., requirements, specification, **TECHNICAL SKILLS**

*Languages*: Java, J2EE, JSP, Servlet, EJB, Struts, JSTL, Log4J, Commons, Swing, Java Bean, Java Mail, JMS, JNDI, JDBC, Ant, UML, XML, XSLT, JavaScript, HTML, CSS, Visual Basic, VBScript, ASP, ODBC, ADO, RDO, DTS, ActiveX, COM, C++, C, FORTRAN, Pascal, SQL, PL/SQL, OLAP, and Shell Scripts

*Software Tools*: JBuilder, IntelliJ, Visual Café, SilverStream, Rational Rose, TogetherSoft, Visio, CVS, Visual SourceSafe, StarTeam, Subversion, Crystal Reports, FrontPage, Visual InterDev, PhotoShop, and Internet Utilities (mail, ftp, telnet, http)

*Servers/Networks*: SQL Server, Oracle Server, Sybase, MS Access, Exchange, LDAP, IIS, Apache, Iplanet, Tomcat, Weblogic, JBoss, JRUN, LAN, WAN

*Software Process*: Object-oriented analysis/design/programming, Design patterns, UP and RUP development process and software development methodologies

*Operating Systems*: Windows 98/NT/2000/XP, Solaris, AIX, IRIX, Linux, MS-DOS, and MacOS

*Machines*: PC, Sun, IBM, SGI, Cray, and Macintosh

**EDUCATION**

University of Minnesota, Minneapolis, MN
Ph.D. Civil Engineering, December 1996 [Overall GPA: 4.00/4.00]
Specialty: Computer Modeling and Simulation

Hohai University, Nanjing, China
M.S. Engineering Mechanics, July 1986 [Overall GPA: 4.00/4.00]

Specialty: Computational Mechanics and Computer Simulation

Metropolitan State University, St. Paul, MN
B.S. Computer Science, May 2002 [Overall GPA: 4.00/4.00]

**HONORS AND MEMBERSHIP**
Listed in Who's Who in Science and Engineering, Editions 1998 to present
Graduate with Honor, Metropolitan State University, 2002
ISWOP Award, University of Minnesota, 1994-1995
Member of Phi Kappa Phi (The Honor Society of Phi Kappa Phi)

| | Robert H. Meyer<br>CURRICULUM<br>VITAE | April 2005 |
|---|---|---|


| OFFICE: WCER, Room 781<br>University of Wisconsin<br>1025 West Johnson Street<br>Madison, WI 53706-1796<br>(608) 265-5663 | (b)(6) |
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| E-MAIL: rhmeyer@wisc.edu | SOCIAL SECURITY #: (b)(6) |
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EDUCATION:

1991 Ph.D., Public Policy, Kennedy School of Government, Harvard University
Dissertation: Beyond Academic Reform: The Role of Vocational Education in American Secondary Education

1978 Masters in Public Policy, Kennedy School of Government, Harvard University

1975 A.B., Economics, Harvard College

PROFESSIONAL BACKGROUND:

1998- Senior Scientist and Center Director, Value-Added Research Center, Wisconsin Center for Education Research (WCER)

1998-2001 Lecturer and Research Associate, Harris Graduate School of Public Policy Studies, University of Chicago

1992-1998 Assistant Professor, Harris Graduate School of Public Policy Studies, University of Chicago

1991-1992 Assistant Professor, Economics Department and La Follette Institute of Public Affairs, University of Wisconsin-Madison

1989-1991 Instructor, Economics Department and La Follette Institute of Public Affairs, University of Wisconsin-Madison

1986-1989 Senior Economist, National Assessment of Vocational Education, U.S. Department of Education

1983-1986 Research Associate, The Brookings Institution

1982-1983 Staff Economist, Council of Economic Advisers

PUBLISHED RESEARCH

"Explaining Variation in the Effects of Welfare-To-Work Programs," (with David Greenberg, Charles Michalopoulous, and Michael Wiseman), Evaluation Review, Vol. 27, no. 4, August 2003, pp. 359-394.

"Value-Added Indicators," The Newsletter of the Comprehensive Center – Region VI, Vol. 6, No. 1, Spring 2001, Wisconsin Center for Education Research, University of Wisconsin-Madison, pp. 7-10.

"Comment on Searching for Indirect Evidence for the Effects of Statewide Reforms," Brookings Papers on Education Policy, 2001, pp. 218-223, 228-229.

"Value-Added Indicators: A Powerful Tool for Evaluating Science and Mathematics Programs and Policies," Issue Brief, Vol. 3, No. 3, 2000, National Institute for Science Education, University of Wisconsin-Madison, 11 pp.

"The Production of Mathematics Skills in High School: What Works?" in Mayer, Susan and Peterson, Paul (eds.), Earning and Learning: How Schools Matter, Washington, DC: Brookings Institution, 1999, pp. 169-204.

"Value-Added Indicators of School Performance," in Hanushek, Eric A. and Jorgenson, Dale W. (eds.), Improving the Performance of America's Schools, Washington, DC: National Academy Press, 1996, pp. 197-223. A modified version of this paper was published as" Value-Added Indicators of School Performance: A Primer," Economics of Education Review, Vol. 16, No. 3, June 1997, pp.283-301.

"Fair and Valid Indicators of School Performance" in Ladd, Helen F. (ed.), Holding Schools Accountable: Performance-Based Reform in Education, Washington, DC: Brookings Institution, 1996, pp.137 - 145; also published in The Report, Harris Graduate School of Public Policy Studies, January, 1997.

"Public School Choice in Minneapolis," (with Steven Glazerman), in Downes, Thomas A. and Testa, William (eds.), Midwest Approaches to School Reform, Proceedings of a Conference Held at the Federal Reserve Bank of Chicago, October 26-27, 1994.

"Multisite Employment and Training Program Evaluations: A Tale of Three Studies"(with David Greenberg and Michael Wiseman), Industrial and Labor Relations Review, Vol. 47, No.4, 1994, pp. 679-691.

"Can Schools Be Held Accountable for Good Performance? A Critique of Common Educational Performance Indicators," in Hoffman, Emily P.(ed.), Essays on the Economics of Education, Kalamazoo:W.E. Upjohn Institute for Employment Research, 1993, pp. 75-109.

"Vocational Training in the United States" (with Robin S. Horn), in Husen, Torsten and T. Neville Postlethwaite(ed.), International Encyclopedia of Education, Oxford:Pergamon Press, 1990, pp.706-714 (also available as "Reform of Secondary Vocational Education in the United States," Institute for Research on Poverty Discussion Paper #923-90, University of Wisconsin at Madison) .

"National Assessment of Vocational Education: Testimony Before the House Education and Labour Committee" (with John Wirt, Lana Muraskin, and David Goodwin), Economics of Education Review, Vol. 8, No. 4, 1989, pp. 383-392.

"Adjusting to Economic Change" (with Robert Z. Lawrence, Lawrence B. Krause, and Linda Cohen), in Alice M. Rivlin (ed.), Economic Choices 1984, The Brookings Institution, 1984, pp. 119-156.

"The Transition from School to Work: The Experiences of Blacks and Whites" (with David Wise), in Ehrenberg, R. (ed.), Research in Labor Economics, Vol. 6, JAI Press, Inc., 1984, pp. 123-176.

"Discontinuous Distributions and Missing Persons: The Minimum Wage and Unemployed Youth" (with David Wise), Econometrica, Vol. 51, No. 6, 1983, pp. 1677-1698.

"The Effects of the Minimum Wage on the Employment and Earnings of Youth" (with David Wise), Journal of Labor Economics, Vol. 1, No. 1, University of Chicago Press, 1983, pp. 66-100.

"Job Training in the Schools," Taylor, Rosen, and Pratzer (eds.), Job Training for Youth, Columbus, Ohio: The Ohio State University, 1982, pp. 307-344.

"High School Preparation and Early Labor Force Experience" (with David Wise) in R. Freeman and D. Wise, The Youth Labor Market Problem: Its Nature, Causes, and Consequences, National Bureau of Economic Research, Chicago: University of Chicago Press, 1982, pp. 277-347.

RECENT REPORTS AND GOVERNMENT PUBLICATIONS

**"Participation in the Student Achievement Guarantee in Education (SAGE) Program and Performance on State Assessments at Grade 3 and Grade 4 for Three Cohorts of Students," (with Norman Webb and Adam Gamoran), Wisconsin Center for Education Research, February 2004,**

83 pp.

"An Evaluation of the Effectiveness of the Urban Systemic Initiative and Other Academic Reforms in Texas: Statistical Models for Analyzing Large-Scale Datasets, report prepared for the National Science Foundation, Wisconsin Center for Education Research, December 2001, 55 pp.

PROFESSIONAL ORGANIZATIONS

| | |
|---|---|
| American Economic Association<br>Econometric Society | National Council on Measurement in Education<br>American Education Research Association |

## Curriculum Vita

Dr. Christopher A. Thorn
University of Wisconsin-Madison
Wisconsin Center for Education Research
1025 W. Johnson St., Room 370
Madison, WI 53706
Phone: (608) 263-2709, Fax: (608)-265-9300
Email: cathorn@wisc.edu

## Education

Doctor of Sociology (with high honors), University of Bielefeld, Germany, 1994
M.A., Political Science, University of Wisconsin-Madison, 1990
M.A., International Relations, The Johns Hopkins University, 1987
B.A., (with honors) Economics and German Language Indiana University, 1985

## Current Research

*Principal Investigator*
*Chicago Community Trust Education Initiative Evaluation*

This three year evaluation effort will be a multi-methods study that examines the three primary areas of the Chicago Community Trust's Education Initiative—Literacy, Professional Development, and Alternative Schools. The research design is based on a nested case model. This model will provide a within-initiative analysis of differing delivery models and goals, as well as a cross-initiative-area comparison of implementation strategies that are independent of content area. In addition, the evaluation team will explore the institutional relationships formed by the various grantees, and the relationships between differing constellations of actors and success.

*Technology Team Leader & Indicator System Data Analysis Leader*
*System-Wide Change for All Learners and Educators (SCALE)*

Five-year NSF-funded research and dissemination project for designing and implementing math and science immersion curricula in K-12 districts. I am the lead of the technology team and working with team leaders in evaluation, curriculum design, and professional development to develop and deploy research-based information technology systems and work processes that support the core goals of the project. I also lead the district-level data analysis team that is evaluating the impact of SCALE activities on teacher practices and student learning.

## Grants, Honors, & Fellowships

Chicago Community Trust ($427,000) – June, 2005-September, 2008
UCSD/SDSC, NSF Subcontract ($304,000) – October, 1999-December, 2004
UW-Madison, School of Education, Distinguished Achievement Award – April, 2004
Carnegie Mellon University, NSF Subcontract ($131,000) – December, 2000-August, 2002
Spencer Foundation Research Grant ($50,000) – April, 1999-April, 2000
Deutsche Forschungsgemeinschaft Research Fellowship, 1993-96
University of Wisconsin Big Ten Traveling Scholar Grant, 1991

German Academic Exchange Service Pre-Dissertation Research Grant, 1990
Fulbright Commission Collaborative Research Grant, 1989
Phi Beta Kappa, Indiana University Chapter, 1985

**Employment History**

*University of Wisconsin-Madison*, Wisconsin Center for Education Research
Assistant Scientist & Director of Technical Services – August 1997 to Present
Lecturer in Research Methods, Educational Psychology – Spring 2005 Semester

*University of Wisconsin-Madison*, Center on Education and Work
Assistant Researcher – December 1995 to August 1997

*University of Bielefeld*, Bielefeld, Germany
Associate Investigator – June 1992 to May 1996

**University and Professional Service**

IFIP: IT in Educational Management Working Group (Secretary) – 2004-2007
AERA Standing Committee on Technology (Chair 2002-2004, 2005-2007) – 2001-2007
UW-Madison, Automated Travel System Development Group, (Co-Chair) – 2005-Present
UW-Madison, School of Education, IT Steering Committee – 1999-Present
UW-Madison, School of Education, IT Policy Advisory Committee – 1997-Present

**Professional Activities**

Spencer Foundation – Information Systems & Strategy Consultant – 2003-Present
MacArthur Research Network on Teaching and Learning – Consultant to the Information Infrastructure System Project – 2002-2004

**Professional Affiliations**

American Educational Research Association (AERA)
International Federation of Information Processing: IT in Educational Management (IFIP)

**Publications - Books & Articles**

Thorn, Christopher A. (2005). Systemic Reform Efforts in the U.S.: Role of Information Technology in Fostering Collaboration within New Partnerships. In Adrie Visscher, Javier Osorio, and Arthur Tatnall (Eds.). *Information Technology in Educational Management*, Dordrecht, Netherlands, Kluwer Academic Publishers.

Thorn, Christopher A. (Forthcoming). The Challenge of Supporting Complex University-School District Partnerships: Scaling up for Whole District School Reform. In Madanmohan Rao (Ed.). *Cultures of Knowledge: How KM Practitioners Nurture and Sustain Knowledge Creating Cultures*, McGraw-Hill, New Delhi.

Thorn, Christopher A. 2004. Building New Systems for Decision Support: Was there a baby in that bathwater? In Arthur Tatnall (Ed.). *Web Portals: the New Gateways to Internet Information and Services,* Idea Group Inc. Melbourne, Australia.

Thorn, Christopher A. 2003. Making Decision Support Systems Useful in the Classroom: Designing a Needs Assessment Process. In Ian Selwood, Alex Fung, and Tuulikki Paturi (Eds.). *Information Technology in Educational Management*, Dordrecht, Netherlands, Kluwer Academic Publishers.

Thorn, Christopher A. 2001. Knowledge Management for Educational Information Systems: What Is the State of the Field? *Education Policy Analysis Archives* 9(47).

Witte, John F. and Christopher A. Thorn. May 1996. Who Chooses? Voucher and Interdistrict Choice Programs in Milwaukee. *American Journal of Education.*

Willke, Helmut, Carsten P. Krueck, and Christopher A. Thorn. 1995. *Benevolent Conspiracies: the role of enabling technologies in the welfare of nations: the cases of SDI, SEMATECH, and EUREKA*. New York: W. de Gruyter.

**Reports and Papers**

Thorn, Christopher A. February 2003. Overview of School Operation and Decision Support Software. A report to the MacArthur Teaching and Learning Network, University of Chicago - Center for School Improvement.

Thorn, Christopher A. April 2002. Data Use in the Classroom: The Challenges of Implementing Data-based Decision-making at the School Level. New Orleans, American Education Research Association Annual Conference.

Thorn, Christopher A. March 2002. Making Decision Support Systems Useful in the Classroom: Designing a Needs Assessment Process. Albuquerque, NM, National Center for Education Statistics, 15th Annual MIS Conference.

Thorn, Christopher A. July 2000. "Knowledge Management for Educational Information Systems: What is the state of the field?" Paper presented at the NCES Data Forum, Washington, D.C.

Thorn, Christopher A. July 1999. "Systemic Reform and the MPS Information System," in *Technical Reports on Milwaukee Public Schools Policy, Information Systems, and Instructional Alignment.* Technical Report 99-1. Madison, WI: University of Wisconsin Madison, Wisconsin Center for Education Research.

Thorn, Christopher A. December 1998. "Information System Design in Support of Reform Efforts," in *Technical Reports on Milwaukee Public Schools Policy, Information Systems, and Instructional Alignment.* Technical Report 98-1. Madison, WI: University of Wisconsin Madison, Wisconsin Center for Education Research.

**Invited Presentations**

January 2004. "Knowledge Management and Collaborative Tools in Complex Partnerships," NSF Math and Science Partnership Learning Network Conference, Washington, D.C.

November 2003, "Decision Support in District Reform Efforts," Consortium for School Improvement, University of Chicago.

January 2003. "Organic School Information Systems: Building a spirit of inquiry versus terraforming by data warehouse." Keynote address and workshop for the Ministry of Education, Ontario Province, Canada.

December 2002. "Superintendents as IT Sensemakers: Information Systems in Support of Instructional Decision Making." University of Pittsburgh Superintendents' Forum - Keynote address.

November 2002. "Characteristics of successful decision support systems." Wisconsin Department of Public Instruction.

**VITA**
**Eileen M. Kellor**

(b)(6)

**Education**

M.S., Industrial Relations, Industrial Relations Research Institute, University of Wisconsin-Madison

*Emphasis*: Unions and collective bargaining

B.A., Economics, University of Wisconsin-Madison. *Emphasis*: Labor Economics and Labor History

**Professional Work History**

***Consortium for Policy Research in Education, Teacher Compensation Project, UW-Madison***

***Associate Researcher June 1998 through January 2005***

- Developed, administered and analyzed employee and supervisor attitude surveys
- Planned and conducted structured data-gathering interviews of employees, supervisors and policy-makers and interpreted and analyzed responses
- Identified data needs and sources and worked with research site to obtain data and supporting documents
- Planned and coordinated practitioner dissemination and marketing activities, including website, listserv, and e-newsletter, and annual national conference on teacher compensation and evaluation.
- Researched and wrote case studies and papers on state and local K-12 compensation programs, standards-based teacher performance appraisal and licensure initiatives, and related topics.
- Developed and presented instructional content for compensation design seminars
- Provided technical assistance to organizations interested in implementing new forms of compensation or performance appraisal

***State of Wisconsin, Department of Employment Relations, Division of Classification and Compensation, Compensation Administration Manager January 1989-June 1998***

- Hired, supervised, and developed staff responsible for developing, implementing, and administering the compensation, leave and benefit provisions for non-represented state employees and elected officials, and for administering the compensation provisions for represented employees.
- Planned and coordinated communication of compensation and benefit program details and issues with state employees and appointed and classified civil service managers in over 40 agencies with offices located across the state.

- Member of statewide management bargaining teams, prepared and presented compensation proposals, provided interpretations and answered questions for management and union teams, took official bargaining notes, prepared contract language in accordance with negotiated agreements
- Interpreted and applied and provided technical assistance and consultation to operating agency personnel representatives on administrative rules, collective bargaining agreements, and federal and state laws relating to employment and benefits, including state and federal family medical leave acts and Fair Labor Standards Act
- Developed and presented formal and informal training on compensation and benefit provisions for a wide range of technical and general audiences.

***State of Wisconsin, Department of Employment Relations, Division of Classification and Compensation Classification Team Leader September 1987-December 1988***

***State of Wisconsin, Department of Employment Relations, Division of Classification and Compensation Classification Analyst September 1985-September 1987***

***Rock County (Janesville, WI) Personnel Department***
***Personnel Generalist March 1984-September 1985***

**Publications**

Kellor, E.M. (2005). *Catching Up with the Vaughn Express: Six Years of Standards-Based Teacher Evaluation and Performance Pay.* Educational Policy Analysis Archives, January 2005.

Kimball, Steven M., Herbert G. Heneman III, & Eileen M. Kellor. (in press). *Can Pensions Help Attract Teachers?* Journal of Education Finance.

**Conference Presentations**

Three Strategies for Connecting the Framework to Teacher Pay: State, District and School Level Examples. Framework for Teaching Users Conference, June 2001, Cleveland, OH.

Cincinnati: A Case Study of the Design of a School-Based Performance Award Program, American Education Finance Association Meeting, March 1999, Seattle, WA.

Using the Framework as a Tool to Align an Internal Human Resources System. Framework for Teaching Users Conference, June 2000. Wakefield, MA.

Kimball, Steven M., Herbert G. Heneman III, & Eileen M. Kellor. (2003, March 27-29, 2003). *Pensions for Teachers: Possible Changes and Implications.* Paper presented at the American Education Finance Association Annual Conference, Orlando, FL.

**Professional service activities**

- Review and analysis of the classified positions in the WCER Business Office.
- Participated on internal WCER committee responsible for reviewing annual performance evaluations for WCER academic staff and making salary increase recommendations.
- Member of internal DER Affirmative Action Advisory Committee.
- Employee Assistance Resource Coordinator for DER employees.

**Relevant community and volunteer service**

- Girl Scouts of Black Hawk Council to the Council's Good to Great Strategic Planning Advisory Committee.
- Board chair, board member, Red Caboose Day Care Center..
- Administrative volunteer (Community Co-Chair) and local troop leader for Girl Scouts of Black Hawk Council.
- Former president, Wisconsin Industrial Relations Research Alumni Association; previous board member and member.

Curriculum Vitae
DOUGLAS M. BATES

Business Address:
Department of Statistics
University of Wisconsin
1210 West Dayton Street
Madison, WI 53706
608/262–2598

(b)(6)

**Education**

Ph.D., 1978, Statistics, Queen's University at Kingston

M.S., 1973, Mathematics, University of California -Los Angeles (U.C.L.A.) B.Sc.(Hons.), 1971, Mathematics, Queen's University at Kingston

**Experience**

Professor; Department of Statistics; University of Wisconsin - Madison; 1994– present.

Professor and Chair; Department of Statistics; University of Wisconsin - Madison; 1991–1994.

Assistant Professor, Associate Professor, and Professor; Department of Statistics; University of Wisconsin - Madison; 1980–1991.

Adjunct Visiting Professor; Department of Mathematics and Statistics; Queen's University at Kingston; 1984.

Statistical Consultant; Statistical Laboratory; University of Wisconsin - Madison; 1980–1982.

Assistant Professor; Department of Mathematics; University of Alberta; 1978– 1980.

**Honors**

Elected a Fellow of the American Statistical Association, 1992.

**Recent and Selected Publications**

**Papers published in, or accepted by refereed journals**

2. "Relative Curvature Measures of Nonlinearity", *Journal of the Royal Statistical Society, Ser. B*, **42**, 1–25, 1980. (With D. Watts).
3. "Accounting for Intrinsic Nonlinearity in Nonlinear Regression Parameter Inference Regions", *Annals of Statistics*, **10**, 386–393, 1981. (With D. Hamilton and D. Watts).
4. "Parameter Transformations for Improved Approximate Confidence Regions in Nonlinear Least Squares", *Annals of Statistics*, **9**, 1152– 1167, 1981. (With D. Watts).
5. "A Relative Offset Orthogonality Convergence Criterion for Nonlin-ear Least Squares", *Technometrics*, **23**, 179–183, 1981. (With D. Watts),
6. "Calculation of Intrinsic and Parameter-Effects Curvatures for Non-linear Regression Models", *Communications in Statistics – Simulation and Computation*, **12**, 469–477, 1982. (With D. Hamilton and D. Watts).

7. "A Multi-Response Gauss–Newton Algorithm", *Communications in Statistics – Simulation and Computation*, **13**, 705–715, 1983. (With D. Watts).
8. "The Derivative of $X^{\bullet} X$ and Its Uses", *Technometrics*, **25**, 373– 376, 1983.
9. "Non-Negative Regression by Givens Rotations", *Communications in Statistics – Simulation and Computation*, **13**, 841–850, 1984. (With D. Wolf).
10. "Fitting First Order Kinetic Models Quickly and Easily", *Journal of Research of the National Bureau of Standards*, **90**, 433–438, 1985. (With D. Watts).
11. "Efficient Support of Statistical Operations", *IEEE Transactions on Software Engineering*, **11**, 1058–1070, 1985. (With S. Khoshafian and D. DeWitt).
12. "Multiresponse Estimation with Special Application to Systems of Linear Differential Equations", *Technometrics*, **27**, 329–339, 1985. (With D. Watts).
13. "GCVPACK – Routines for Generalized Cross Validation", *Communications in Statistics – Simulation and Computation*, **16**, 263–297, 1987. (With M. Lindstrom, G. Wahba, and B. Yandell).
14. "A Generalized Gauss–Newton Procedure for Multi-Response Parameter Estimation", *SIAM Journal of Scientific and Statistical Com-puting*, **7**, 49–55, 1987. (With D. Watts).
15. "Newton–Raphson and EM Algorithms for Linear Mixed Effects Models for Repeated Measures Data", *Journal of the American Statistical Association*, **83**, 1014–1022, 1988. (With M. Lindstrom).
16. "The Computation of GCV Functions Through Householder Tridiagonalization with Application to the Fitting of Interaction Spline Models", *SIAM J. Matrix Anal. Applic.*, **10**(4), 457–480, 1989. (With C. Gu, Z. Chen, and G. Wahba)
17. "Approximate Inferences in Multiresponse Regression Analysis", *Biometrika*, **77**(2), 321–331, 1990. (With G. Kang).
18. "Nonlinear Mixed Effects Models for Repeated Measures Data", *Bio-metrics*, **46**, 673–687, 1990. (With M. Lindstrom).
19. "Model Building in Chemistry Using Profile t and Trace Plots", *Chemo-metrics and Intelligent Laboratory Systems*, **10**, 107–116, 1991. (With D. Watts).
19. "Loosely Coupled Nonlinear Least Squares", *Computational Statis-tics and Data Analysis*, **14**, 249–259, 1992. (With Y-W. Soo).
20. "Getting Better Contour Plots with S and GCVPACK", *Computational Statistics and Data Analysis*, **15**, 329–342, 1993. (With F. Reames and G. Wahba).
21. "Approximations to the Log-Likelihood Function in the Nonlinear Mixed Effects Model", *Journal of Computational and Graphical Statistics*, **4**, 12–35, 1995. (With J. Pinheiro).
22. "Multiresponse Spline Regression", *Computational Statistics and Data Analysis*, **18**, 619–631, 1996. (With Y.-W. Soo).
23. "Parameterizations for Variance-Covariance Matrices", *Statistical Computing*, **6**, 289–296, 1996. (With J. Pinheiro)
24. "Linear and nonlinear mixed-effects models", *Applied Statistics in Agriculture*, **10**, 1–21, 1998. (With J. Pinheiro)

**Books**

*Nonlinear Regression Analysis and Its Applications*, Wiley, New York, 1988. (With Donald G. Watts).
*Minitab Supplement for Devore's "Probability and Statistics for Enggneering and the Sciences"*, Brooks/Cole, Belmont, CA, 1991.

*Mixed-effects Models in S and S-PLUS*, Springer-Verlag, New York, 2000. (With Jose C. Pinheiro).

**Recent Invited Proceedings Papers or Book Chapters**

"A Framework for Research in Database Management for Statistical Analysis", in *Proceedings of the ACM Special Interest Group on the Management of Data*, Assoc. for Computing Machinery, New York, 1982. (With H. Boral and D. DeWitt).

"Teaching Statistical Computing" in *Proceedings of the Statistical Computing Section*, American Statistical Assoc, New York, 1982.

"Computational Methods for Generalized Cross Validation with Large Data Sets" in *Treatment of Integral Equations by Numerical Methods*, eds. C. Baker and G. Miller, Academic Press, New York, 1982. (With G. Wahba).

"Computational Methods for Generalized Cross Validation" in *Proceedings of Computer Science and Statistics: Sixteenth Symposium on the Interface*, ed. L. Billard, North-Holland, New York, 1983.

"Secondary Storage Methods for Statistical Computational Operations" in *Proceedings of Computer Science and Statistics: Sixteenth Symposium on the Interface*, ed. L. Billard, North-Holland, New York, 1983. (With S. Khoshafian and D.DeWitt).

"Simplified Methods of Assessing Nonlinearity" in *Proceedings of the Business and Economics Statistics Section*, American Statistical Assoc, New York, 1983. (With M. Goldberg and D. Watts).

"Nonlinear Least Squares and First-Order Kinetics" in *Proceedings of Computer Science and Statistics: Seventeenth Symposium on the Interface*, ed. D. Allen, North-Holland, New York, 1985. (With D. Wolf and D. Watts).

"Database Machine Support for Efficient Access to Large Statistical Databases" in *Proceedings of the First LBL Workshop on Statistical Database Management*, 233–236, ed. H. Wong, Lawrence Berkeley Laboratory, Berkeley, CA, 1985. (With H. Boral and D. DeWitt).

"Statistical Models as Data Structures", in *Proceedings of Computer Science and Statistics: Nineteenth Symposium on the Interface*, ed. R. Heiberger, North-Holland, New York, 1987. (With J. Chambers).

"A Comparison of Approaches to Inference for Nonlinear Models", in *Proceedings of Computer Science and Statistics: Twenty-third Sym-posium on the Interface*, ed. E. Keramidas, Wiley, New York, 1991. (With C. Ritter and S. Bisgaard).

"Nonlinear Models" in *Statistical Models in S*, John M. Chambers and Trevor J. Hastie (ed.), Wadsworth, Belmont, CA., 1991 (with John M. Chambers).

"Data Manipulation in Perl", in *Proceedings of Computer Science and Statistics: Twenty-fourth Symposium on the Interface*, ed. J. New-ton, 456–462, Interface Foundation, Fairfax, VA, 1992.

"Teaching the Geometry of Nonlinear Models" in *1993 Proceedings of the Section on Statistical Education*, American Statistical Association, 1993.

"Design Considerations for Nonlinear Calibration" in *1994 Proceedings of the Section on Physical and Engineering Sciences*, American Statistical Association, 1994. (With S. Martin).

"Model Building for Nonlinear Mixed Effects Models" in *1994 Proceedings of the Biopharmaceutical Section*, American Statistical Association, 1994. (With J. Pinheiro and M. Lindstrom).

Curriculum Vitae of

**Christopher H. Fassnacht**

(b)(6)

Department of

University of Wisconsin-Madison

608 263-3872 (work)
(b)(6)
608-265-9300 (fax)

1180 Observatory Drive
Madison, WI 53706
cfassnac@wisc.edu

**Educational Background**

**University of Wisconsin**, Madison, Wisconsin
Currently ABD. Thesis: "The Constitution of Cognition in the Clinic."
Advisor: Prof. Douglas Maynard.

1993-4 Written preliminary examinations: Social Psychology, Sociology of Science.
Minor Field: Philosophy.

1993 M.S. in Sociology. Thesis: "Predictivity in Human Interaction: On the Motivation for Attribution, Intersubjectivity, and Social Order."

**University of California**, Santa Cruz, California
1991 B.A. in Sociology, with honors in the major and highest college honors.

**Publications**

STEP Research Group* (2000). "Promoting teachers' flexible use of the learning sciences through case-based problem solving on the WWW: A theoretical design approach." In B. Fishman & S. O'Connor-Divelbiss (Eds.), *Proceedings of the Fourth International Conference of the Learning Sciences.*(pp. 273-279). Mahwah, NJ: Erlbaum. (*Siegel, M., Derry, S., Kim, J.-B., Steinkuehler, C., Street, J., Canty, N., Fassnacht, C., Hewson, K., Hmelo, C., & Spiro, R.).

Jane Zuengler, Cecilia Ford, and Christopher H. Fassnacht (1999), "Analyst Eyes and Camera Eyes: Theoretical and Technological Considerations in 'Seeing' the Details of Classroom Interaction." *Report Series 2.40. National Research Center on English Learning & Achievement.* Albany: University of Albany, State University of New York.

**Presentations**

Fassnacht, C. (2003). "The Collaborative Production of Cognitive Status in Succedent Settings of the Clinic." International Institute for Ethnomethodology and Conversation Analysis Conference on Producing Local Order. Manchester, UK.

Fassnacht, C. (2003). "From Interaction to Cognition: the Conversational Transformation of Child Testing into Cognitive Ability." Fourteenth Annual Winter Conference on Discourse, Text & Cognition. Jackson Hole, WY.

Fassnacht, C. & Woods, D. "Transana, a Tool for the Transcription and Analysis of Video Data." Workshop on Methods for Studying Interaction. Madison, WI.

Fassnacht, C. (2002). "Second Pair Part Turn Construction and the Inference of Cognitive Ability." Midwest Sociological Society Annual Meeting, Milwaukee, WI.

Derry, S. J., Seymour, J. Feltovich, P., & Fassnacht, C. (2001). "Tutoring and knowledge construction during problem-based learning: An interaction analysis." Annual Conference National Association for Research in Science Teaching (NARST), St. Louis MO.

Derry, S. J., Steinkuehler, C. A., & Fassnacht, C. (2000). "Designing instructional web sites to support inclusive problem-based learning." Annual Conference of the Center for Innovative Learning Technologies (CILT), Washington D. C.

Derry, S.J. & the STEP Research Group* (2000). "Reconceptualizing professional development: Collaborative video projects on the World Wide Web. Annual Meeting of American Educational Research Association, New Orleans, LA." (*P. Feltovich, R. Spiro, C. Hmelo, C. Fassnacht, C. Steinkuehler, J. Street, J.-B. Kim, N. Canty, J. Posselt, J. Lee, B. Beitzel, M. Siegel, J. Seymour, B. Viola, & Y. Lee)

Ford, C. & Fassnacht, C. (1999), "Negation in Turn Construction." Midwest Sociological Society Annual Meeting, Minneapolis, MN.

Fassnacht, C. (1998), "The PALS Project and Measurement." National Center on English Learning and Achievement Mid-Project Review, Albany, NY.

Fassnacht, C. (1998), "Advanced Web Searching Techniques." Wisconsin Center for Education Research Technical Services Seminar, Madison, WI.

Fassnacht, C. (1997), "Cognition-In-Interaction at Sites of Discovery." American Sociological Association Annual Meeting, Toronto, Canada.

Zuengler, J., Ford, C., & Fassnacht, C. (1997), "Data Collection as Theory." National Center on English Learning and Achievement, Center Conference, Madison, WI.

Ford, C. & Fassnacht, C. (1997), "A Conversation Analytic Lens on Discourse in Education." Wisconsin Center for Education Research, Mini-Conference on Classroom Discourse, Madison, WI.

Yamane, D. & Fassnacht, C. (1995), "A Liberal Communitarian Defense of Basic Income," American Sociological Association Annual Meeting, Washington, D.C.

**Software**

Fassnacht, C. (1995), Creator of "Transana" software for the transcription and analysis of audio/visual data. Currently in production.

**Honors and Achievements**

1991-95 National Science Foundation Graduate Fellowship.

1992-93 University of Wisconsin, University Fellowship.
1991 Elected to Phi Beta Kappa.
1990-91 University of California, University Scholarship.

Robert S. Glover
Wisconsin Center for Education Research
University of Wisconsin – Madison
1025 West Johnson Street, Madison, WI 53706
608-663-0761
rglover@wisc.edu

**Recent Project Experience**

*Student Indicator Database*
*SCALE (A project funded by NSF)*
*November 2003 to Present*

Designed and implemented a database on SQL Server 2000 to support longitudinal analysis of student test data and teacher professional development for the NSF funded project SCALE. Responsibilities include development of data cleaning, resolution of conflicting data definitions, and loading of data from four school districts using complex SQL scripts, and overall database administration. Additional deliverables for this project include design and implementation of a data entry application (developed in C#.NET), creation of analysis data sets, and creation of "data marts" that can support "ad-hoc" queries.

*Personnel / Project Management Database*
*WCER*
*University Wisconsin – Madison*
*November 2003 to Present*

Designed and currently developing a database application that supports the WCER Business Office. This application is being developed with C#.NET and SQL Server 2000 will replace an existing Access database application that manages personnel and project information including project appointments and project funding. Additional deliverables for this project included analysis of the information and technology requirements for the office and integration of disparate data sources into a single application.

**Education**

Bachelor Science Chemistry
Wake Forest University
May 1977

**Certifications**

Microsoft Certified Professional Solution Developer

**David J. Sleasman**

*University of Wisconsin-Madison, Wic*
(b)(6) *Work: 608•262-2063* *Email: djsleasman@wisc.edu*

## EMPLOYMENT HISTORY

Knowledge Manager
SCALE Project, Wisconsin Center for Education Research, Madison WI 1/2004-

Coordinate and lead development of the Vignette Collaboration Server to further partnership communication. Facilitate collaborative work through assisting, coaching, and problem-solving with research staff and faculty. Organize and collect partnership resources and materials within VCBS. Plan and lead development of the system. Develop and conduct training on the system and work to maximize use and implementation across the partnership. Develop strategies and set priorities for development. Coordinate the SCALE partnership Web site. Develop procedures and editorial control for content development of Web site.

Metadata and Cataloging Coordinator
Internet Scout Project, University of Wisconsin-Madison, Madison WI 2/2001-1/2004

Manage the cataloging and classification of Internet resources for Scout Resource Archive in unison with established and emerging bibliographic and metadata standards, specifically Dublin Core Element Set, to insure bibliographic integrity. Coordinate cataloging policy and workflow for ISP initiatives and guide metadata functionality for software development projects. Contribute information management skills, problem-solving and proactive research to the ISP team projects. Lead software quality assurance testing and write software help documentation. Coordinate communication with software beta testers and implementers. Manage projects, train and supervise Project Assistants and interns. Participate in team grant writing and fundraising efforts. Contribute to ISP publications and efforts to inform and educate the education, business and research communities about ISP projects and tools.

Cataloging/Reference Librarian
Madison Area Technical College Library, Madison WI 5/1999-1/2001

Catalog and classify audio-visual and electronic resources. Coordinate Reference Collection resources and management. Provide Reference and research assistance to students, faculty and staff. Select print and WWW resources in assigned subject areas. Formally and informally instruct on the use of information technology and library resources. Develop pathfinders, instructional help and bibliographies. Develop and maintain excellent working relationships with faculty. Research and coordinate use of electronic database products. Resolve service issues with electronic resource vendors.

*Committees: Webpage Management Team, Cataloging Team, Renovation planning, Library Instruction Team*
*Selection areas: Visual Arts, Architecture, Social Sciences, Economics, Psychology, and Philosophy*

Reference Librarian
Hedberg Public Library, Janesville WI 5/1996-5/1999

Provide reference and reader's advisory services. Instruct on the use of the library's materials and equipment, information technology and the Internet. Coordinate selection and review of electronic reference products. Assist in training staff members on new or evolving electronic products. Participate in planning and policy development of the Reference Department especially for electronic resources. Select and manage print and sound recording collections in assigned subject areas. Oversee and maintain the local history collection. Coordinate with the Computer Manager to assure good quality public and staff service and problem resolution for equipment, software and electronic reference products.

*Committees: Collection Development Team, Technology Management Team, Webpage Advisory Committee*
*Selection areas: Art, Architecture, Film, Classical Music and Opera, Economics, Psychology, Local History, Philosophy*

Assistant Curator
Special Collections Dept., University of Pittsburgh Libraries, Pittsburgh PA 3/1989-10/1995

Provide reference service for the Special Collections Department and the Archives Service Center. Organize acquisitions and develop automated/traditional access tools in accordance with national standards. Oversee maintenance, preservation and rehabilitation of the collection. Curate exhibitions of books, prints, and ephemera and install other departmental exhibits. Train/Supervise student assistants. Write articles about the Department's exhibitions, collections and activities. Instructor for training workshops.

*Committees: Director's Advisory Council, Archives Automation Working Group, and Archives Automation Committee*
*Selection areas: Performing Arts archives, papers, prints, and emphemera*

Library Specialist II
Frick Fine Arts Library, University of Pittsburgh Libraries, Pittsburgh, PA 12/87-3/89

Provide reference service for Art, Architecture and related topics to faculty, graduate and undergraduate students. Manage reserve book/periodical collection. Receipt, binding and maintenance of periodicals. Train and supervise student assistants.

**RELATED WORK EXPERIENCE**

Brodart Automation 4/2000-6/2001
Brodart Inc., Williamsport PA (Part-time)

Customized free-lance MARC cataloging of World Wide Web resources.

Brodart Automation 4-5/2000
Brodart Inc., Williamsport PA (Part-time)

Customized free-lance MARC cataloging of World Wide Web resources.

Business, Industry, and Community Instruction 6/1999-1/2001
Madison Area Technical College, Madison WI (Part-time)

Develop curriculum and instruct on the use of the World Wide Web as a research tool.

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**EDUCATION**

1995 University of Pittsburgh, School of Library and Information Science • M.L.S.
1987 University of Pittsburgh • B.A. Psychology/Economics

**PUBLICATIONS**

***Bower et al. Internet Scout Project's Metadata Management Experience. In D. Hillman and E. Westbrooks (Eds)* Metadata in Practice: A Work in Progress *(Spring 2004)***

Almasy et al. Software *for Building a Full-Featured Discipline-Based Web Portal: The Scout Portal Toolkit*, D-Lib Magazine (Nov. 2002)
<http://www.dlib.org/dlib/november02/almasy/11almasy.html>

**PRESENTATIONS**

6/2002 Scout Portal Toolkit as part of a LITA panel at American Library Association meeting on WWW portal development
5/2000 Using the Internet for Research: A workshop for K-12 Teachers and Educators.
5/2000 Finding images and sounds on the WWW: Workshop for MATC Tech Academy
6/1999 Using the Internet for Research: A workshop for K-12 Teachers and Educators.

# JULIE K. UNDERWOOD

**Office**
National School Boards Association
**Address:** 1680
Duke Street

Alexandria, Virginia 22314

(703)
838-6710

Junderwood@nsba.org

## FORMAL EDUCATION

| | | |
|---|---|---|
| 1984 | University of Florida, Gainesville, FL | Ph.D. |
| 1979 | Indiana University, Bloomington, IN | J.D. |
| 1976 | DePauw University, Greencastle, IN | B.A. |

## ADMITTED TO BAR

U.S. Supreme Court
1998
Eleven of the Thirteen U.S. Circuit Courts of Appeals 1998/1999
Wisconsin
1991
Florida
1982
Indiana
1979

## EMPLOYMENT HISTORY

2005-Present **Dean,** School of Education, University of Wisconsin-Madison

1998 – 2005 **Associate Executive Director and General Counsel**. National School Boards Association.

1995 – 1998 **Dean**. School of Education & Allied Professions, Miami University.

1988 – 1998 **Attorney**. Friedman Law Firm

1986 – 1995 **Faculty**. University of Wisconsin, Madison. Teaching school law courses.

- 1994-1995 **Associate Dean**. School of Education. Responsibilities primarily included working with the University Attorney and Office of Affirmative Action on all legal concerns for the School of Education.
- 1993-1994 **Chair**. Department of Educational Administration.
- 1990-1995 **Professor**. Department of Educational Administration.
- 1990-1993 **Co-Director**. Wisconsin Center for Education Policy, Robert

M.
LaFollette Institute of Public Affairs.
1986-1989 **Assistant Professor**. Department of Educational Administration.

1988 – 1995 **Attorney**. Wisconsin Department of Public Instruction.

1982 – 1986 **Faculty**. University of North Dakota. Teaching school law, school finance and education policy.
1986 **Assistant Dean**. Center for Teaching and Learning.
**Assistant Professor**. Educational Administration.

1981 - 1982 **Research Associate**. University of Florida. Institute for Educational Finance. **Instructor**. School of Law. Teaching legal research and writing.

**BOOKS**

Underwood J., & Webb L. (in press). School Law for Teachers. Columbus, OH: Prentice Hall.
Underwood, J. (2005, 2003). No Child Left Behind Resource Documents. Alexandria, VA: Council of School Attorneys National School Boards Association.
Underwood, J., & Mead, J. (1995). Legal aspects of special education and pupil services. Needham Heights, MA: Allyn & Bacon.
Camp, W., Underwood, J., Connelly, M., & Lane, K. (Eds.). (1993). The principal's legal handbook. Topeka, KS: National Organization on Legal Problems of Education.
Underwood, J., & Verstegen, D. (Eds.). (1990). The impact of litigation and legislation on public school finance. New York, NY: Harper & Row Publishing Co.
Camp, W., Underwood, J., & Connelly, M. (Eds.). (1989). Principals' handbook: Current issues in school law. Topeka, KS: National Organization on Legal Problems of Education.
Monk, D., & Underwood, J. (Eds.). (1988). Microlevel school finance: Issues and implications for policy. Cambridge, MA: Ballinger Publishing Company.

**RECENT CHAPTERS IN BOOKS**

Underwood, J. (2004). Foreword in Hanks, J. School Violence: From Discipline to Due Process. Chicago, IL: American Bar Association Publishing.
Underwood, J. (2004). The Unfulfilled Promise of *Brown v. Board of Education.* In Council of Attorneys, School Law In Review. Alexandria, VA: National School Boards Association.
Underwood, J. (2003). Supreme Court Update. In Council of School Attorneys, School Law In Review. Alexandria, VA: National School Boards Association.
Underwood, J. (2003). The Legal System. In Council of School Attorneys, Understanding & Limiting School Board Member Liability. Alexandria, VA: National School Boards Association.
Underwood, J. (2002). Supreme Court Update. In Council of School Attorneys, School Law In Review. Alexandria, VA: National School Boards Association.
Underwood, J. (2001). Choice, The American Common School, and Democracy. In R. Soder, J. Goodlad & T. McMannon (Ed.), Developing Democratic Character in the Young. San Francisco, CA: Jossey-Bass.
Underwood, J., and Verstegen, D. (1990). School finance challenges in federal courts: Changing equal protection analysis. In J. Underwood and D. Verstegen (Eds.), The impact of litigation and legislation on public school finance. New York, NY: Harper & Row Publishing Co.

Underwood, J. (1990). State legislative responses to educational reform literature. In Paul Thurston (Ed.), Advances in educational administration. Greenwich, CT: JAI Press, Inc.

**RECENT ARTICLES**

Underwood, J. (2004). Off-Campus Behavior: Are Your Hands Tied? Principals' Leadership, 4 (1)

Smith, S., J.L. Myers, & Underwood J. (2003). "Blowing In the Wind". American School Board Journal, (18).

Underwood, J. (2002, August/September). Supreme Court News: Final Opinions Issued. Inquiry & Analysis.

Underwood, J. & Stainback, J. (2002, July). Private Funding of School Construction. Inquiry & Analysis.

Underwood, J. (2001, October). Facilities Use after *Good News v. Milford*. Inquiry & Analysis.

Underwood, J. (2001, May). Graduation Issues. Inquiry & Analysis.

Mead, J., & Underwood J. (2001). *Lemon* Distilled With Four Votes for Vouchers: An Examination of *Mitchell v. Helms* and its Implications. Education Law Reporter, 149 (3).

Russo, C., Underwood, J., & Cambron-McCabe, N. (2000). The Top Ten Education Law Cases: The Supreme Court's Impact on Schooling. International Journal of Educational Reform, 9 (1).

Underwood, J. (1995). School finance adequacy as Vertical Equity. University of Michigan Journal of Law Reform, 28 (3).

Underwood, J., & Meredith, B. (1995). Irreconcilable differences? Defining the rising conflict between regular and special education. Journal of Law and Education. 24 (2).

Underwood, J. (1994). School finance litigation: Legal theories, judicial activism, and social neglect. Journal of Education Finance, 20 (2).

Underwood, J., & Sparkman, W. E. (1991). School finance litigation: A new wave of reform. Harvard Journal of Law and Public Policy, 14 (2).

Underwood, J. (1990). Changing establishment analysis within and outside the context of education. Howard Law Journal, 33 (1).

Underwood J. (1989). Changing equal protection analyses in finance equity litigation. Journal of Education Finance, 14(3), 413-425.

**SELECTED RECENT PRESENTATIONS**

Underwood, J. (2004, November). Supreme Court Update. Education Law Association's 50th Annual Conference, Second General Session, Tucson, Arizona.

Underwood, J. (2004, March). Supreme Court Update and National Legal Trends. National School Boards Association's 64th Annual Conference, Orlando, Florida.

Underwood, J. (2004, October). An Exploration of Recent Decisions from the State and Federal
Courts Affecting Public Schools. NSBA's Council of School Attorneys' 2004 Advocacy
Seminar, Savannah, Georgia.
Underwood, J. (2002, August). Special Education. Oxford Roundtable on Special Education.
St. Antony's College, Oxford University, England.
Underwood, J. (2000, July). Providing Children Education to Participate in a Democracy.
Oxford Round Table on Education Policy Public School Law, St. Antony's College,
Oxford University, England.

**Adam Gamoran**

Department of Sociology

1180 Observatory Drive

Madison, WI 53706

Tel: (608) 262-1498 Fax: (608) 265-5389 E-mail: gamoran@ssc.wisc.edu

*Education*

A.B., Near Eastern Languages and Civilizations, University of Chicago, 1979
A.M., Social Sciences, University of Chicago, 1979
Ph.D., Education, University of Chicago, 1984

*Positions Held (last five years)*

Director, Wisconsin Center for Education Research, University of Wisconsin-Madison, 2004-present
Chair, Department of Sociology, University of Wisconsin-Madison, 2001-2004
Assistant to Associate to Professor of Sociology and Educational Policy Studies, University of Wisconsin-Madison, 1984-present

**Research and Training Support (last five years)**

"Interdisciplinary Training Program for Predoctoral Research in Education Sciences." Institute of Education Sciences, U.S. Department of Education, $5,000,000, 8/05-7/10.

"Long-term Effects of School Desegregation." Subcontract with Vanderbilt University to the Institute for Research on Poverty, funded by the William T. Grant Foundation, $154,699, 9/01-8/04.

"Analysis of Chicago Jewish Schools Pilot Study Data." Subcontract with the Center on Public and Private Schools, University of Notre Dame, funded by the U.S. Department of Education, $51,540, 9/02-8/03.

"Spencer Mentor Award." The Spencer Foundation, $50,000, 3/99-8/02.

"Discourse Environment and Student Achievement" (with Martin Nystrand and Lawrence Wu) and "Cross-Site Analyses" (with Arthur Applebee, Judith Langer, and Martin Nystrand). Center on English Learning and Achievement, Office of Educational Research and Improvement, $495,791, 3/96-2/01. Extension, "Evaluation of the Partnership for Literacy," $600,000, 3/01-2/03.

"Organizational Capacity to Support Classrooms that Promote Understanding" (with Cora Marrett, Walter Secada, and William Tate). National Center on Improving Student Learning and Achievement in Mathematics and Science, Office of Educational Research and Improvement, $836,319, 3/96-2/01. Extension, "Cross-Site Analyses of District and School Contexts," $140,000, 3/01-2/03.

*Honors*

Member, Sociological Research Association, elected 2002
Member, National Academy of Education, elected 2001
Mentor Award, The Spencer Foundation, 1999-2001
Mandel Fellow, Mandel Institute, Jerusalem, Israel, 1998
Fulbright Scholar, United Kingdom, 1992-1993
Spencer Fellow, National Academy of Education, 1989-1990
Citation for Excellence in Teaching, Department of Sociology, University of Wisconsin, Madison, 1989

Outstanding Dissertation Award, Division G, American Educational Research Association, 1985
Phi Beta Kappa, elected 1979

## Editorial and Advisory Activities (last five years)

Editorial Board Member, *Educational Evaluation and Policy Analysis*, 2003-present
Editorial Board Member, *Educational Researcher*, 2001-03
Editorial Board Member, Teacher's College Press series in Sociology of Education, 1992-present
Editorial Board Member, *Sociology of Education*, 1987-92 and 1996-99
Review Coordinator, Report on State Science Assessments, National Research Council, National Academy of Sciences, 2004-2005
Review Coordinator, Report on Quality of K-12 Curricular Evaluations, National Research Council, National Academy of Sciences, 2003-2004
Committee on Talking it Through: Cross-National Conversations about Secondary Mathematics Curricula, National Research Council, National Academy of Sciences, 2002-03

Committee on A Framework and Long-Term Research Agenda for International Comparative Education Studies, National Research Council, National Academy of Sciences, 2002-03

Board on International Comparative Studies of Education, National Research Council, National Academy of Sciences, 1998-03

Technical Working Group, Evaluation of the Magnet Schools Assistance Program, U.S. Department of Education, 1998-02

Dissertation Fellowship Selection Committee, The Spencer Foundation, 1998-00
Technical Review Panel, NELS Fourth Follow-Up, U. S. Department of Education, 1998-00

**Publications (recent and selected)**

*Books*

Gamoran, Adam, Charles W. Anderson, Pamela Anne Quiroz, Walter G. Secada, Tona Williams, and Scott Ashmann. 2003. *Transforming Teaching in Math and Science: How Schools and Districts Can Support Change.* New York: Teachers College Press.

Hallinan, Maureen T., Adam Gamoran, Warren Kubitschek, and Tom Loveless, Editors. 2003. *Stability and Change in American Education: Structure, Process, and Outcomes.* Clinton Corners, NY: Eliot Werner Publications.

Porter, Andrew C., and Adam Gamoran, Editors. 2002. *Methodological Advances in Cross-National Surveys of Educational Achievement.* Washington, DC: National Academy Press.

Articles and Chapters

Gamoran, Adam. 2004. Classroom organization and instructional equity. Pp. 141-155 in M. C. Wang and H. J. Walberg (Eds.), *Can unlike students learn together? Grade retention, tracking, and grouping,* Greenwich, CT: Information Age Publishing, pp. 141-155 (2004).

Applebee, Arthur N., Judith Langer, Martin Nystrand, and Adam Gamoran. 2003. "Discussion-Based Approaches to Developing Understanding: Classroom Instruction and Student Performance in Middle and High School English." *American Educational Research Journal, 40, 685-730.*

Gamoran, Adam. 2002. "Beyond Curriculum Wars: Content and Understanding in Mathematics." Pp. 134-162 in T. Loveless (Ed.), *The Great Curriculum Debate: How Should We Teach Reading and Math?* Washington, DC: Brookings.

Lucas, Samuel R., and Adam Gamoran. 2002. "Track Assignment and the Black-White Test Score Gap: Divergent and Convergent Evidence from 1980 and 1990 Sophomores." Pp. 171-198 in T. Loveless (Ed.), *Closing the Gap: Promising Strategies for Reducing the Achievement Gap.* Washington, DC: Brookings.

Carbonaro, William J., and Adam Gamoran. 2002. "The Production of Achievement Inequality in High School English." *American Educational Research Journal, 39*, 801-827.

Ehrenberg, Ronald G., Dominic J. Brewer, Adam Gamoran, and J. Douglas Willms. 2001. "Does Class Size Matter?" *Scientific American, 285*, 32-40.

Gamoran, Adam. 2001. "American Schooling and Educational Inequality: Forecast for the 21st Century." *Sociology of Education, 34* (Extra Issue), 135-153.

Gamoran, Adam, Walter G. Secada, and Cora B. Marrett. 2000. "The Organizational Context of Teaching and Learning: Changing Theoretical Perspectives." Pp. 37-63 in M. T.

Hallinan (Ed.), *Handbook of the Sociology of Education*. New York: Kluwer Academic/Plenum.

Gamoran, Adam, and Eileen C. Hannigan. 2000. "Algebra for Everyone? Benefits of College-Preparatory Mathematics for Students with Diverse Abilities in the Early Secondary School." *Educational Evaluation and Policy Analysis, 22*, 241-254.

Gamoran, Adam. 2000. "High Standards: A Strategy for Equalizing Opportunities for Learning?" Pp. 93-126 in R. D. Kahlenberg (Ed.), *A Notion at Risk: Preserving Public Education as an Engine for Social Mobility*. New York: The Century Foundation.

Gamoran, Adam, and Matthew Weinstein. 1998. "Differentiation and Opportunity in Restructured Schools." *American Journal of Education*, *106*, 385-415.

Gamoran, Adam, Andrew C. Porter, John Smithson, and Paula A. White. 1997. "Upgrading High School Mathematics Instruction: Improving Learning Opportunities for Low-Income, Low-Achieving Youth." *Educational Evaluation and Policy Analysis*, *19*, 325-338.

Gamoran, Adam. 1996. "Student Achievement in Public Magnet, Public Comprehensive, and Private City High Schools." *Educational Evaluation and Policy Analysis*, *18*, 1-18.

Gamoran, Adam. 1992. "The Variable Effects of High School Tracking." *American Sociological Review*, *57*, 812-828.

Gamoran, Adam, and Robert D. Mare. 1989. "Secondary School Tracking and Educational Inequality: Compensation, Reinforcement, or Neutrality?" *American Journal of Sociology*, *94*, 1146-1183.

Daniel M. Bolt

Department of Educational Psychology
University of Wisconsin-Madison
1025 W. Johnson Street
Madison, WI 53706
Telephone: 608-262-4938
Fax: 608-262-0843
E-mail: dmbolt@facstaff.wisc.edu

**Education**

| | | |
|---|---|---|
| Ph.D. | University of Illinois at Urbana-Champaign<br>Psychology (Quantitative Methods) | 1999 |
| M.S. | University of Illinois at Urbana-Champaign<br>Statistics | 1995 |
| B.A. | Calvin College<br>Psychology/Mathematics | 1992 |

**Positions Held**

2004-present Associate Professor, Department of Educational Psychology, Division of Quantitative Methods, University of Wisconsin-Madison
Affiliate Faculty, Department of Psychology

1999-2004 Assistant Professor, Department of Educational Psychology, Division of Quantitative Methods, University of Wisconsin-Madison
Affiliate Faculty, Department of Psychology (2000-)

**Honors and Awards**

Jason Millman Promising Scholar Award, awarded by the National Council on Measurement in Education (NCME) in recognition of scholarly research in the field of applied measurement during the early stages of career, April, 2003

Maurice Tatsuoka Scholar, University of Illinois at Urbana-Champaign, 1997-1998

**Research Publications (Articles and Chapters)**

Bolt, D.M. & Kim, J-S. (in press). Hierarchical IRT modeling. In B. Everitt & D. Howell (Eds.), Encyclopedia of statistics in the behavioral sciences. Wiley.

Bolt, D.M. (in press). Limited and full-information IRT estimation. In A. Maydeu- Olivares and J. McArdle (Eds.), Contemporary Psychometrics: A Festschrift to Roderick P. McDonald. Lawrence-Erlbaum.

Bolt, D.M. (in press). Analyzing the Psychopathy Checklist-Revised (PCL-R) using factor analysis and item response theory: Overview and recent advances. In J.Yuille & H. Herve (Eds.) Psychopathy in the Third Millennium: Theory and Research. Lawrence Erlbaum.

Vitale, J.E., Newman, J.P., Serin, R.C., & Bolt, D.M. (in press). Hostile attributions in incarcerated male offenders: An exploration of diverse pathways. Aggressive Behavior.

Li, Y.M., Bolt, D.M. & Fu, J.B. (in press). A test characteristic curve linking method for the testlet model. Applied Psychological Measurement.

Cohen. A.S., & Bolt, D.M. (in press). A mixture model analysis of differential item functioning. Journal of Educational Measurement.

Kim,D.M. Wampold, B.E. & Bolt, D.M (in press). Therapist effects in psychotherapy: Random effects modeling of the NIMH TDCRP data. Psychotherapy Research.

Ysseldyke, J., Thill, T, Pohl, J., & Bolt, D. (in press). Using MathFacts in a Flash to enhance computational fluency. Journal of Evidence Based Practices in Schools.

Bolt, D.M., Hare, R.D., Vitale, J., & Newman, J. (2004). A multigroup item response theory analysis of the Psychopathy Checklist-Revised (PCL-R). Psychological Assessment, 16, 155-168.

Piper, M.E., Felderman, E.B., Piasecki, T.M., Bolt, D.M., Smith, S.S., Fiore, M.C., & Baker, T.B. (2004). A multiple motives approach to tobacco dependence: The Wisconsin Inventory of Smoking Dependence Motives (WISDM). Journal of Consulting and Clinical Psychology, 72, 139-154.

Bolt, D.M. & Lall, V.F. (2003). Estimation of compensatory and noncompensatory multidimensional IRT models using Markov chain Monte Carlo. Applied Psychological Measurement, 27, 395-414.

Hudmon, K.S., Marks, J.L., Pomerleau, C.S., Bolt, D.M., Brigham, J., & Swan, G.E. (2003). A multidimensional model for characterizing tobacco dependence. Nicotine and Tobacco Research, 5, 655-664.

Begun, A L., Murphy, C., Bolt, D., Short, L., Strodthoff, T., Weinstein, B., Shelley, G.(2003). Characteristics of the Safe-at-Home Instrument for assessing readiness to change intimate partner violence. Research in Social Work Practice, 13, 80-107.

Bolt, D.M., Cohen, A.S., & Wollack, J.A. (2002). Item parameter estimation under conditions of test speededness: Application of a mixture Rasch model with ordinal constraints. Journal of Educational Measurement, 39, 331-348.

Wollack, J.A., Bolt, D.M., Cohen, A.S., & Lee,Y-S. (2002). Recovery of item parameters in the nominal response model: A comparison of marginal maximum likelihood estimation and Markov chain Monte Carlo estimation. Applied Psychological Measurement, 26, 337-350.

Bolt, D.M. (2002). A Monte Carlo comparison of parametric and nonparametric polytomous DIF detection methods. Applied Measurement in Education, 15, 113-142.

Bolt, D.M., Cohen, A.S., & Wollack, J.A. (2001). A mixture item response model for multiple-choice data. Journal of Educational and Behavioral Statistics, 26, 381-409.

Bolt, D.M. (2001). Conditional covariance-based representation of multidimensional test structure. Applied Psychological Measurement, 25, 244-257.

Gierl, M.J. & Bolt, D.M. (2001). Illustrating the use of nonparametric regression to assess differential item and bundle functioning across multiple groups. International Journal of Testing, 3&4, 249-270.

Bolt, D.M. (2000). A SIBTEST approach to testing DIF hypotheses using experimentally designed test items. Journal of Educational Measurement, 37, 307-327.

Bolt, D.M. & Rounds, J. (2000). Advances in psychometric theory and methods. In S.D Brown & R.W. Lent (Eds.), Handbook of Counseling Psychology (pp. 140-176). New York: John Wiley & Sons.

Bolt, D.M. (1999). Evaluating the effects of multidimensionality on IRT true-score equating. Applied Measurement in Education, 12, 383-406.

McDonald, R.P. & Bolt, D.M. (1998). The determinacy of variables in structural equation models. Multivariate Behavioral Research, 33, 385-401.

Stout,W., Li, H., Nandakumar, R., & Bolt, D. (1997). MULTISIB: A procedure to investigate DIF in intentionally two-dimensional data. Applied Psychological Measurement, 21, 195-213.

Bolt, D. & Stout, W. (1996). Differential item functioning: Its multidimensional model and resulting SIBTEST detection procedure. Behaviormetrika, 23, 67-95.

Shoemaker, A. & Bolt, D.M. (1992). Computer measurement of the autokinetic effect. Perceptual and Motor Skills, 75, 771-777.

**Editorial and Advisory Activities**

**Consulting Editor, Journal of Abnormal Psychology** ***(2004-present)***

**Ad Hoc Journal Reviewer***: Applied Psychological Measurement, Cognition and Instruction,* Journal of Educational Measurement , Journal of the American Statistical Association, Journal of Abnormal Psychology, Journal of Personality and Social Psychology, Psychological Methods, Psychological Assessment, Psychometrika, Review of Educational Research, Review of Research in Education, Structural Equation Modeling

**Conference Review:** ***Reviewer of paper proposals, American Educational Research Association (AERA) and National Council on Measurement in Education (NCME) Annual meetings (2000-present), Reviewer of NCME training program proposals (2002)***

*Grant Review:* Reviewer of National Institute of Mental Health (NIMH), National Institute of Health (NIH) proposals, 2003-present.

**H. Gary Cook**

(b)(6)

| | | |
|---|---|---|
| **Education** | *May 2001* | Ph.D., Educational Measurement, Evaluation and Research Design, Michigan State University |
| | *June 1990* | MA, Teaching English as a Second Language (TESOL), University of Hawai'i at Manoa |
| | *June 1988* | BA, Linguistics, University of Hawai'i at Manoa |
| Positions Held | *January 2005 to present* | **Research Scientist**<br>Wisconsin Center for Educational Research. Function as an embedded researcher and manage Milwaukee Pubic School's research and evaluation process. Provide policy research and program evaluation consultation and services for training staff within the Milwaukee Public Schools in advanced statistics for the Value-Added Research at Milwaukee Public Schools project. |

*June 2002 to December 2004*

**Vice President of State Accounts**

Harcourt Assessment, Inc. Direct and manage company's State-level National Measurement Consultants. Provide leadership role and national strategy for winning and expanding statewide assessment accounts. Provide psychometric and statistical support for state clients as well as organizing support for regional Vice Presidents and Measurement Consultants. Provide expert advice regarding state and federal legislation, especially as it relates to the No Child Left Behind Act of 2001. Represent Harcourt at regional and national meetings, conferences and organizations.

*October 1998 to June 2002*

**Director, Office of Educational Accountability**

Wisconsin Department of Public Instruction. Direct the development, administration, scoring, reporting and management of the state of Wisconsin's public school assessment programs. Responsible for the supervision of 17 professional assessment staff members as well as the management of a $5 million annual state assessment budget.

*August 1990 to 1998*

**Testing Coordinator**

English Language Center, Michigan State University (MSU). Responsible for the development and administration of the English language testing program and consult in English language research at MSU.

*August 1990 to 1998*

**Specialist**

English Language Center, MSU. Responsible for curriculum development, in additional responsible to teach advanced English for academic purposes preparation courses for incoming international students at MSU.

**ERIC M. CAMBURN**
University of Wisconsin-Madison
Education Leadership & Policy Analysis
1186C Educational Sciences
1025 West Johnson St
Madison, WI 53706
Phone: (608) 263-3697 | E-mail: ecamburn@education.wisc.edu
Web: http://www.education.wisc.edu/elpa/people/faculty/camburn.html

**Education**

1997 University of Chicago: Ph.D. Education; Program in Measurement, Evaluation, and Statistical Analysis;
1989 University of Chicago: M.A. Social Science Divisional Masters Program
1983 Illinois Benedictine College: B.A. Sociology

**Professional Experience**

2004-Present Assistant Professor, Educational Leadership and Policy Analysis, University of Wisconsin-Madison
2003 Instructor, College of Education, Educational Administration Department, Michigan State University
1997 - 2004 Assistant Research Scientist, School of Education, University of Michigan; Associate Director of Survey Studies, Study of Instructional Improvement
1991 - 1997 Research Associate, Consortium on Chicago School Research, University of Chicago
1993 – 1994 Teaching Assistant, Department of Education, University of Chicago.
1987 - 1991 Assistant Survey Director, NORC, University of Chicago
1986 – 1987 Research Assistant, Metropolitan Opportunity Project, University of Chicago
1984 – 1986 Senior Research Analyst, Procter and Gamble Account, Market Facts

## Other Professional Experience

*Editorial Board Member:* Educational Administration Quarterly (2004-2005)
*Reviewer*: American Educational Research Association Divisions A and D; American Educational Research Association Special Interest Groups on Survey Research, School Climate and Effectiveness, and Workplace Learning; American Educational Research Journal; American Journal of Education; Educational Evaluation and Policy Analysis; Journal of Education of Students Placed at Risk; Sociology of Education; Teachers College Record.
*Consultant*: National Catholic Education Association, National Opinion Research Center, North Central Regional Educational Laboratory, National Clearinghouse for Comprehensive School Reform
*Section Chair:* AERA Annual Meeting 2003, School improvement section of Division A (Educational Administration).

*Member*: University of Michigan Behavioral Sciences Institutional Review Board (2003-2004)

**Academic Awards and Distinctions**

2002 William J. Davis Memorial Award for the most outstanding article in Vol. 35 of the journal Educational Administration Quarterly. 2000.

1991 – 1994 Century Scholarship. University of Chicago

**Grants and Funded Projects**

2004-2006 Atlantic Philanthropies. *Instructional Improvement Through Comprehensive School Reform: Investigations From the Study of Instructional Improvement.* Principal Investigator. ($214,866)

2004-2007 U.S. Department of Education. *Assessing the Impact of Principals' Professional Development: An Evaluation of the National Institute for School Leadership.* Co-principal Investigator. ($374,566)

1999-2000 American Institutes for Research in the Behavioral Sciences (Educational Statistics Service Institute): *Development of an instructional log.* Co-principal investigator. ($50,000).

1995 University of Chicago School Math Project *Examining connections between professional community, teacher learning, and instruction.* Principal investigator. ($17,000).

1988 NORC (NORC Director's Grant). *Refining the High School and Beyond urbanicity measures.* ($2,000).

**Publications**

Camburn, E., and Barnes, C. (2004). *Assessing the validity of a language arts instruction log through triangulation.* Elementary School Journal, 105, 49-74.

Rowan, B., Camburn, E., & Barnes, C. (2004). *Benefiting from comprehensive school reform: A review of research on CSR implementation.* In C. Cross (Ed.), Putting the pieces together: Lessons from comprehensive school reform research (pp. 1-52). Washington, DC: National Clearinghouse for Comprehensive School Reform.

Rowan, B., Camburn, E., and Correnti, R. (2004). *Using teacher logs to measure the enacted curriculum: A study of literacy teaching in third-grade classrooms.* Elementary School Journal, 105, 75-102.

Camburn, E., Rowan, B., and Taylor, J. (2003). *Distributed Leadership in Schools: The Case of Elementary Schools Adopting Comprehensive School Reform Models.* Educational Evaluation and Policy Analysis. 25(4), 347-373.

Bryk, A., Camburn, E., and Seashore Louis, K. (1999). *Professional community in Chicago elementary schools: Facilitating factors and organizational consequences* Educational Administration Quarterly. 35 (Supplement, December), 751-781.

Roderick, M., and Camburn, E. (1999). *Risk and recovery from course failure in the early years of high school.* American Educational Research Journal. 36(2).

Camburn, E. (1990). *College completion among students from high schools located in large*

*metropolitan areas*. American Journal of Education. 98(4).

Ball, D.L., Camburn, E., Correnti, R., Phelps, G., Wallace, R. (1999). *New Tools for Research on Instruction and Instructional Policy: A Web-based Teacher Log*. Center for the Study of Teaching and Policy (CTP), University of Washington. CTP working paper W-99-2.

Bryk, A., Camburn, E., and Seashore Louis, K. (1997). *Professional Community in Chicago Elementary Schools: Facilitating Factors and Organizational Consequences. Revised. Final Deliverable to OERI.* Office of Educational Research and Improvement (ED), Washington, DC. Wisconsin Center for Education Research, Madison.

Roderick, M., and Camburn, E. (1996). Academic difficulty during the high school transition. In *Charting reform: The students speak.* Chicago: The Consortium on Chicago School Research.

Green, P.J., Dugoni, B.L., Ingels, S.J., and Camburn, E. (1995). *A profile of the American high school senior in 1992.* Washington D.C.: National Center for Education Statistics. NCES 95-384.

Sebring P.A., and Camburn, E. (1992). A profile of eighth graders in Catholic schools: Based on the National Educational Longitudinal Study of 1988. Washington D.C.: National Catholic Education Association.

**List of papers in press, under review and presented at conferences available upon request**

## Professional Affiliations

American Association of Public Opinion Researchers
American Educational Research Association
American Educational Research Association, Special Interest Group on Survey Research

| | | |
|---|---|---|
| | *August 1992 to Present* | **Educational Research Consultant**<br>Measurement Plus+, Lansing, MI. Owner and chief consultant. Work with secondary and post-secondary institutions in the areas of measurement, program evaluation and research with specialty areas in large-scale state assessment, English language learner assessment, and special education assessment. Clients have been Ferris State University, Princeton University, University of Michigan, Central Michigan University, University of Detroit, Lansing Community College. |
| | *August 1989 to June 1990* | **Testing Coordinator**<br>English Language Institute, University of Hawai'i at Manoa. Responsible for the supervision, administration and development of the English language testing program at the English Language Institute. |
| | *August 1989 to June 1990* | **Writing Instructor**<br>English Language Institute, University of Hawai'i at Manoa. |
| | *June 1988 to August 1989* | **ESL Instructor**<br>Pacific International Language School, McKinley High School, and New Intensive Course in English (N.I.C.E.) Program, Honolulu Hawai'i. |
| **Grant Awards** | *October 2004 to September 2005* | **Hawaii Alternate Assessment Development**<br>Co-principle investigator of an Office of Special Education Programs grant to develop the state's special education alternate assessment system. Grant value $411,000. |

# Richard Halverson

Department of Educational Administration
School of Education
University of Wisconsin-Madison
halverson@education.wisc.edu
1025 W. Johnson, Madison WI 53706

Work Phone: (608) 265-4772
(b)(6)
Email:


## Research Interests

20. Developing a theoretical framework for analyzing complex school leadership practices by drawing on classical and contemporary theories of expert practice;
21. Conducting empirical investigations of how this framework can contribute to what we know about some of the chronic contemporary issues of school leadership practice, and;
22. Designing case-based research methods and examples using multimedia technologies to understand how to communicate leadership practices.

## Professional Experience

2001- Assistant Professor, Department of Educational Administration, University of Wisconsin-Madison. *Madison, WI*

1996-2001 Research Assistant *School of Education and Social Policy, Northwestern University*. Evanston, IL

1993-1996 Principal, *Seton Academy High School*, South Holland Illinois.

1990-1995 Curriculum and Technology Coordinator, *Seton Academy High School*, South Holland, Illinois.

1987-1996 Teacher, *Seton Academy High School*, South Holland, Illinois.

## Education

2002 Ph.D., in School of Education and Social Policy, Northwestern University. Dissertation title: *Representing Phronesis: Documenting instructional leadership practice in schools.*

1987 MA in Philosophy, Northwestern University 1987.

1984 BA in Philosophy and History, Marquette University 1984.

## Refereed Articles

In press Halverson, R. "What Can K-12 School Leaders Learn from Video Games and Gaming?" *Innovate: Journal of Online Education.*

Halverson, R., and Rah, Y. "Representing leadership for social justice: The case of Franklin School." *Journal of Cases in Educational Leadership.*

2004 Halverson, R. "Accessing, documenting and communicating the *phronesis* of school leadership practice." *American Journal of Education, 111(1),* 90-122.

Spillane, J. P., Halverson, R., & Diamond, J. B. Towards a theory of leadership practice: A distributed perspective. *Journal of Curriculum Studies*, 36(1), 3-34.

Halverson, R., Linnekin, B. Spillane, J. & Gomez, L. Multimedia cases of practice: On-line learning opportunities for school leaders. *Journal of Cases in Educational Leadership 7(1).* Available at http://www.ucea.org/cases/V7-Iss1/index7-1.htm

2003 Halverson, R. Systems of practice: How leaders use artifacts to create professional community in schools. *Educational Policy and Analysis Archives.* v11, n37. Accessible on-line at http://epaa.asu.edu/epaa/v11n37/

2001 Spillane, J. P., Halverson, R. and Diamond, J.B. "Investigating school leadership practice: A distributed perspective." *Educational Researcher* 30(3): 23-27.

Spillane, J.P., Diamond, J., Walker, L. J., Halverson, R., Jita, L.. "Urban school leadership and elementary science instruction: Identifying, mobilizing and activating resources in a devalued subject area." *Journal of Research in Science Teaching.* v38, n8, 918-940.

## Book Chapters

2004 Halverson, R., Kelley, C. & Kimball, S. "Implementing teacher evaluation systems: How principals make sense of complex artifacts to shape local instructional practice." in C. Miskel (Ed.) *Theory and Research in Educational Administration, Volume 3.*

## Recent Conference Papers (Refereed)

2004 Halverson, R., and Clifford, M. "Evaluation in the wild: A distributed cognition perspective on teacher assessment." Paper presented at the 2004 University Council of Educational Administration Annual Meeting, Kansas City, Mo.

Halverson, R., Madda, K. and Gomez, L. "Exploring coherence as an organizational resource for carrying out reform initiatives." Paper presented at the 2004 American Educational Research Association Annual Meeting, San Diego, CA.

Halverson, R. and Clifford, M. "How the situation of practice shapes the implementation of new policies in schools." Paper presented at the 2004 American Educational Research Association Annual Meeting, San Diego, CA.

2003 Halverson, R. A distributed leadership perspective on the SCALE theory of action. Paper presented at the 2003 SCALE Research Group Think-Tank. Madison, WI.

Halverson, R. Representing leadership for social justice: The case of Franklin School. Paper presented at the 2003 University Council of Educational Administration Annual Meeting, Portland, OR.

Halverson, R, Kelley, C. & Kimball, S. Implementing teacher evaluation systems: How principals make sense of complex artifacts to shape local instructional practice. Paper presented at the 2003 American Educational Research Association Annual Meeting, Chicago, IL.

Halverson, R. Multimedia narratives of practice: On-line learning opportunities for school leaders. Paper presented at the 2003 American Educational Research Association Annual Meeting, Chicago, IL.

**VITA**

***Anthony T. Milanowski***
Assistant Scientist
Wisconsin Center for Educational Research
University of Wisconsin-Madison
1025 West Johnson Street, Madison, WI 53706
(608) 262-9872
amilanow@facstaff.wisc.edu

**Education**

Ph.D., University of Wisconsin-Madison, Industrial Relations Research Institute, 1997. Major field: Human Resources Management; Minor field: Research Methods.

M.A., University of Wisconsin-Madison, Public Administration, 1986.

B.A., University of Wisconsin-Milwaukee, Philosophy, 1974.

**Current Projects**

Consortium for Policy Research in Education, Teacher Compensation Project, 1997-present. Responsible for coordinating and conducting research on the contribution of new forms

of compensation and performance appraisal to organizational effectiveness in the K-12 education sector, developing seminars and providing technical assistance to organizations interested in implementing compensation or performance appraisal programs.

School Finance Redesign Project, Cost of Teacher Turnover (beginning Spring 2005). Responsible for designing and coordinating a study of the costs and causes of teacher turnover in the Milwaukee Public Schools. Funded by the Gates Foundation via a subcontract with the University of Washington.

**Selected Publications**

Milanowski, A.T., Kimball, S.M., and Odden, A. (2005). Teacher accountability measures and links to learning. Chapter contributed to the 2005 American Educational Finance Association Yearbook *Measuring School Performance and Efficiency: Implications for Practice and Research.* L. Stiefel, A.E. Schwartz, R. Rubenstein, and J. Zabel, eds. 137-159.

.

Milanowski, A.T. (2004). The relationship between teacher performance evaluation scores and student achievement: Evidence from Cincinnati. *Peabody Journal of Education,* 79:4, 33-53.

Kimball, S.M., White, B., Milanowski, A.T., and Borman, G. (2004). Examining the relationship between teacher evaluation and student assessment results in Washoe County. *Peabody Journal of Education,* 79:4,54-78.

Heneman, H.G. III, and Milanowski, A.T. (2004) Alignment of human resource practices and teacher performance competency. *Peabody Journal of Education,* 79:4, 108-125.

Heneman, H.G. III, and Milanowski, A.T. (2003). Continuing assessment of teacher reactions to a standards-based teacher evaluation system. *Journal of Personnel Evaluation in Education,* 17:3, 171-195.

*Anthony T. Milanowski*

**Selected Publications,** continued

Milanowski, A.T. (2003). An exploration of the pay levels needed to attract students with mathematics, science and technology skills to a career in K-12 teaching. *Education Policy Analysis Archives,* 11(50). Located at http://epaa.asu.edu/epaa/v11n50/.

Milanowski, A.T. (2003). The varieties of knowledge and skill-based pay design: a comparison of seven new pay systems for K-12 teachers. *Education Policy Analysis Archives*, 11(4). Located at http://epaa.asu.edu/epaa/v11n4/.

Kelley, C., Heneman, H. III, and Milanowski, A. (2002). School-based performance rewards: research findings and future directions. *Educational Administration Quarterly,* 38:3, 372-401.

Milanowski, A.T., and Heneman, H.G. III. (2001). Assessment of teacher reactions to a standards-based teacher evaluation system: A pilot study. *Journal of Personnel Evaluation in Education,* 15:3, 193-212.

Milanowski, A.T. (2000). School-based performance award programs and teacher motivation. *Journal of Education Finance,* 25:4, 517-544.

Milanowski, A.T. (1999). Measurement error or meaningful change? The consistency of school achievement in two school-based performance award programs. *Journal of Personnel Evaluation in Education,* 12:4,343-363.

Heneman, H.G. III, and Milanowski, A.T. (1999). Teachers' attitudes about teacher bonuses under school-based performance award programs. *Journal of Personnel Evaluation in Education,* 12:4,327-341.

**Recent Conference Presentations**

Milanowski, A.T., and Kimball, S. M. The Relationship Between Teacher Expertise and Student Achievement: A Synthesis of Three Years of Data. Paper presented at the American Educational Research Association Annual Meeting, Montreal, Canada, April 13, 2005.

Milanowski, A.T., Kimball, S., and White, B. The Relationship Between Standards-Based Teacher Evaluation Scores and Student Achievement: Replication and Extensions at Three Sites. Paper presented at the 2004 Annual Meeting of the American Educational Research Association, Chicago, IL, April 14, 2004.

Milanowski, A.T. Relationships Among Dimension Scores of Standards-Based Teacher Evaluation Systems, and The Stability of Evaluation Score - Student Achievement Relationships Over Time. Paper presented at the 2004 Annual Meeting of the American Educational Research Association, Chicago, IL, April 14, 2004.

Milanowski, A. T. Using Occupational Characteristics Information from O*NET to Identify Occupations for Compensation Comparisons with K-12 Teachers. Paper presented at 2003 Annual Meeting of the American Educational Finance Association, Orlando, FL, March 28, 2003.

*Anthony T. Milanowski*

**Teaching and Related Experience**

- Lecturer, University of Wisconsin-Madison, School of Education, Fall 2003, 2004.
- Participating Faculty, Industrial Relations Research Institute, 1997-2002.
- Lecturer, University of Wisconsin-Madison, School of Business, various semesters, 1993-2001.

**Professional Human Resource Management Experience**

- Compensation Analyst, Wisconsin Department of Employment Relations (1995)
- Senior Compensation Planner and Team Leader, Wisconsin Department of Employment Relations, 1988-1993.
- Personnel Specialist, Wisconsin Department of Employment Relations, 1981-1987.
- Personnel Specialist, Wisconsin Department of Health and Social Services, 1979-1981.

Responsibilities included developing models used to estimate costs of collective bargaining agreements, providing cost analysis for management bargaining teams, conducting job analysis and evaluation studies, designing and administering wage surveys, designing and conducting employee attitude surveys, developing selection tests, providing consultation to managers on human resource issues, serving as staff to three Governor's study commissions on compensation issues, and serving as staff to the Civil Service Reform Commission.

**Human Resource Management Consulting and Contract Research**

Cincinnati Public School District, Cincinnati, Ohio, Spring, 2005
La Crescent-Hokah School District, La Crescent, Minnesota, Summer, 2002,
Cincinnati Public School District, Cincinnati, Ohio, Spring, 2002
Cincinnati Public School District, Cincinnati, Ohio, Spring, 2001
Cincinnati Public School District, Cincinnati, Ohio, Spring, 2000
State of Kentucky Department of Education, Frankfort, Kentucky, March 1999
Colonial School District, Plymouth Meeting, Pennsylvania, December, 1998
Cincinnati Public School District, Cincinnati, Ohio, Spring, 1998
Fox Valley Technical College, Appleton, Wisconsin, 1994
Wisconsin Counties Association, 1992
Dane County, Wisconsin, 1986

**Professional Association Memberships**

Academy of Management
American Educational Finance Association
American Educational Research Association
American Evaluation Association
American Society for Public Administration
Industrial Relations Research Association

**John L. Smithson**
Wisconsin Center for Education Research
University of Wisconsin - Madison
1025 W. Johnson Street
Madison, Wisconsin 53706
(608) 263-4354
johns@education.wisc.edu

**PROFESSIONAL PREPARATION**

| | | |
|---|---|---|
| University of Wisconsin -- Milwaukee | Educational Studies | B.S., 1985 |
| University of Wisconsin -- Milwaukee | Cultural Foundations of Education | M.S., 1986 |
| University of Wisconsin -- Madison | Educational Policy Studies | Ph.D., 1998 |

**APPOINTMENTS**

2002 - Present **Wisconsin Center for Education Research**, ***Co-Principal Investigator, Longitudinal Design to Measure the Effects of MSP Professional Development (MSP) Project.***

1998 - Present **Wisconsin Center for Education Research, *Project Director, Measures of the Enacted Curriculum (MEC) Project.***

1999 - 2004 **Wisconsin Center for Education Research, *Co-Principal Investigator, Data on Enacted Curriculum (DEC) Project.***

1999 - 2001 **Wisconsin Center for Education Research, *Project Director, Design and Development of a Science Assessment Resource Compact Disk .***

2001 – 2003 **Wisconsin Center for Education Research, *Research Associate, Consortium for Policy Research in Education (CPRE).***

1994 - 1998 **Wisconsin Center for Education Research, *Research Consultant, Council of Chief State School Officers (CCSSO) Surveys of Enacted Curriculum (SEC) Collaborative.***

**Publications**

Smithson, J.L. (2004). Converging paths: common themes in making assessments useful to teachers and systems. In M. Wilson (Ed.), *Towards Coherence Between Classroom Assessment and Accountability.* The 2004 yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press.

Smithson, J.L. & Porter, A.C. (2004). From policy to practice: the evolution of one approach to describing and using curriculum data. In M. Wilson (Ed.), *Towards Coherence Between Classroom Assessment and Accountability.* The 2004 yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press.

Porter, A.C. & Smithson, J.L. (2001). Defining, developing, and using curriculum indicators. CPRE Research Report Series RR-048. Philadelphia, PA: University of Pennsylvania, Consortium for Policy Research in Education.

Blank, R.K., Porter, A.C., & Smithson, J.L. (2001). New Tools for Analyzing Teaching, Curriculum and Standards in Mathematics & Science. Washington, DC: Council of Chief State School Officers.

Porter, A.C. & Smithson, J.L. (2001). Are content standards being implemented in the classroom? A methodology and some tentative answers. In S. Fuhrman (Ed.), *From the Capitol to the Classroom: Standards-based reform in the states.* The 2001 yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press

Gamoran, A., Porter, A.C., Smithson, J., & White, P.A. (1997, Winter). Upgrading high school mathematics instruction: Improving learning opportunities for low-achieving, low-income youth. Educational Evaluation and Policy Analysis, 19(4),

Porter, A.C., Smithson, J., & Osthoff, E. (1994). Standard setting as a strategy for upgrading high school mathematics and science. In R. F. Elmore & S. H. Furhrman (Eds.), The governance of curriculum: 1994 yearbook of the Association for Supervision and Curriculum Development (pp. 138-166). Alexandria, VA: Association for Supervision and Curriculum Development.

Porter, A.C., Kirst, M.W., Osthoff, E.J., Smithson, J.L., & Schneider, S.A. (1993). Reform Up Close: An analysis of high school mathematics and science classrooms. (Final report to the National Science Foundation on Grant No. SPA-8953446 to the Consortium for Policy Research in Education.). Madison: University of Wisconsin-Madison, Wisconsin Center for Education Research.

Smithson, J.L., Porter, A.C. (1994). Measuring classroom practice: Lessons learned from efforts to describe the enacted curriculum -- The Reform-Up-Close Study. CPRE Research Report Series Report #31. New Brunswick, NJ: Rutgers University, Consortium for Policy Research in Education.

**Synergistic Activities**

- Co-principal Investigator on NSF funded grant to develop and test using a randomized design, the effects of a professional development program designed to present information to teacher's on instructional practice and content on changing teacher practice.
- Collaborative partner with the Council of Chief State School Officers and their state members to test tools for describing instructional practices and alignment of instructional practices to state and district assessments and content standards.
- Co-principal Investigator on NSF funded grant to examine the effects of MSP sponsored professional development activities on teacher practice and student achievement.
- Operations Director for data collection, processing and reporting activities to support independent state-sponsored Math Science Partnerships and other curriculum-based initiatives in several states.
- Member, Advisory Panel for program evaluation of Explorer Schools, a NASA-sponsored educational initiative.

**Budget Justification MDE**

The information included in this section describes the resources necessary for the Minnesota Department of Education to accomplish the proposed scope of work. Proposed resource costs integrate personnel salaries, projected fringe benefits, travel, equipment, supplies, contractual services, indirect costs, and training-related expenses. All estimates are based on current salaries and wages, current costs and/or MDE past purchases, and accounting data. Following are descriptions of the expenses included in each category:

**1. Personnel FTE**

Should this project be funded, MDE's share of the proposed work will involve four main types of personnel that will enable the department to develop a full-service state longitudinal data system: (1) in-kind commitments of time by existing DPI staff, (2) project management staff hired through WCER, (3) contract support staff, and (4) five new positions.

(1) Existing MDE staff: lead IT staff will be assigned to work on and/or manage key parts of this project. In the personnel descriptions below we report estimates of the percent of time that senior management and staff will devote to this project even though it should be understood that the salaries of these staff are covered by existing state funds.
(2) Project management staff: these staff will be hired through WCER and are described in WCER's budget narrative.
(3) Contracted staff: funding has been set aside to allow the hiring of support staff on a contractual basis as determined by project needs.
(4) New positions: it is anticipated that five new staff will be hired to complete MDE's share of the proposed work. These five new positions will include four technical staff with expertise in data dictionary, data access policy, data analysis, secure data transport, and warehouse data collection and portal delivery systems, and one data warehouse publication manager.

**2. Benefits/Fringe Costs**

Fringe benefit rates vary by employee classification, as established by State of Minnesota system policies. In recent years, fringe benefit rates have increased consistently on an annual basis.

**3. Travel**

All reimbursements for transportation, lodging, meals, and related costs are included in this category. Travel expense reimbursements are made on the basis of actual and reasonable expenditures. Payments are governed by Minnesota State Statutes and Travel Regulations. Travel estimates are based on past accounting experience, allowable travel expenses based on the State of Minnesota travel regulations and travel quotes from Minnesota travel agencies.

The budget includes travel for quarterly meetings with the tri-state consortium for the length of the grant. It includes travel to provide presentations and some training to districts and vendors on the data warehouse and provides for consulting/coordination meetings to the tri-state consortium on the areas of the proposal for which Minnesota is the lead.

**4. Equipment**

Hardware In order for Data Warehouses to be successful, they must be available, stable and fast. There are two important components when considering performance. One is the design of the warehouse where relational components must be designed to take advantage of the

capabilities of the database engine. The second component is hardware the warehouse is running on. Not only is CPU speed important but disk access speed for a warehouse is critical.

MDE will leverage existing hardware during the initial development and pilot stages of the Data Warehouse but will require additional hardware capabilities as the size and audience of the warehouse expands. Our budget includes an expansion of our existing hardware in year three to meet the production demand. We will be using open systems or Microsoft Windows based platforms that meet State of Wisconsin standards and policies.

Other software applications that get developed or interfaced can leverage our current infrastructure and require no additional hardware purchases.

Software MDE makes every attempt to find off the shelf software that can be used to meet our needs before developing our own solutions. Generally we find that we can purchase infrastructure software that we can then tailor to meet our needs. We will continue with this purchasing philosophy for the purposes of this grant.

The budget includes new development and infrastructure software purchase in the first 2 years, with additional licensing to ramp up user access and support in the third year.

We have identified software packages that will aid us in delivering a quality solution. These packages include:

- SQLServer – Will be the database engine for our data warehouse. SQLServer is the standard database engine used by MDE and therefore is required for this project.
- Cognos Powerplay and ReportNet servers (or similar tools). Cognos is the industry leader in providing secure web-based access, and also has a significant presence in education. We will be able to leverage this knowledge as we "roll out" their tools. ReportNet gives us the ability to create various targeted reports for our stakeholders, and Powerplay will allow us to give researchers the ability to access our data in safe and secure manners.
- A Data Dictionary tool (vendor to be determined) will give us the ability to easily structure and update our data dictionary. If the data dictionary is not easy to update, over time it will become stale and obsolete.
- A Common Development framework (vendor to be determined). Not all of our needs can be provided by "out of the box" tools. We will need to develop software and interfaces specific to MDE needs and our user requirements. To do this as easily as possible we will require a development framework that boosts the productivity of our development staff.
- Microsoft Sharepoint services provide excellent services for managing and collaborating on software development. It also provides an excellent front end to Microsoft databases. This tool will be used by both product development and as the initial access point to the data warehouse.
- Portal Software (vendor to be determined) provides the interface to the data. Portal software is designed to restrict access to data the user is allowed to see. It also allows end users to customize their interface to our data. Portal software is the most important component in creating a satisfied end user.

**5. Supplies**

This covers basic supply costs including printing and copying services, mailing costs and other miscellaneous costs associated with supporting a major implementation project.

**6. Contractual**

The budget includes the cost of contractual assistance to manage and implement the proposal.

**Wisconsin Management Fee**

This line includes $200,000 each year that will be paid to the Wisconsin Center for Education Research (WCER). WCER will provide project management and coordination services between the tri-state consortium. They are integral in the collaboration of the three states providing components of a complete and quality system. They will also provide end-use and research assistance to MDE. MDE will use this help and information to design and improve the data warehouse and resulting reporting and data availability.

**Contractor Support Staff**

This line includes $200,000 for all three years that will be used to include contract staff to augment MDE staff in software, data warehouse and infrastructure development, and implementation. Rates and vendors will be based on the State of Minnesota Master Roster Contract System. We expect to augment internal staff skill sets with additional data modeling and dimensional skills as well as data warehouse extraction, population, and access control knowledge.

**10. Indirect Costs/FTE**

This line covers the following project support costs: administration of grants, contracts, subcontracts and agreements; budget consultation and preparation; programmatic accounting; financial reporting/monitoring; fiscal consultation; personnel services/activities; policy, procedure and regulation consultation; expenditure audit/review; facility management; equipment management; computer and multimedia support (not covered by direct costs); mail and shipment delivery; secretarial pool management; telephone installation, rental, and general usage; normal equipment service; normal editorial service; normal graphic service; office supplies; and miscellaneous program support; and facility operation and maintenance, and building usage charge.

**11. Training**

Training is budgeted for current MDE program area staff and IT staff. This includes data warehouse concept and design training as well as training in the development and implementation of tools and utilities that will be chosen. The costs assume higher upfront training costs and then fewer new and refresher training efforts for support and maintenance staff as the project is fully implemented.

**WI CENTER FOR EDUCATION RESEARCH**

**Budget Justification**

The information included in this proposal indicates the resources necessary for the Wisconsin Center for Education Research to accomplish the work described in the Technical Proposal. Resource requirements in this proposal were defined by the principal investigators. Estimated resource costs have been generated by the Center Business Office, integrating salaries, projected merit increases, projected fringe benefits, travel, identified supplies and services, and overhead rates,. All estimates are based on current salaries and wages, current costs and/or Center accounting data. Following are descriptions of the expenses included in each category:

**1. PERSONNEL**

All persons who work regularly for the Center are placed on the University of Wisconsin payroll in accordance with established University procedures. Titles and stipends are regulated and approved by Center management, the Dean of the School of Education, Madison Campus and University Central Administration. Salaries for professorial, professional, and graduate assistant staff are based on current salaries. Merit increments are calculated each year at 4.5% effective fall semester for professorial staff and effective July 1 for professional staff, and at 4% effective July 1 for graduate assistant staff.

The level of effort indicator used is Full Time Equivalent (FTE). One FTE equals one person working full time for one year. One year for academic staff (professorial) is a nine-month academic year and a two and two-thirds months summer session. Annual staff (professional and graduate assistant) is appointed on a twelve-month basis.

Staffing for this project is split across three state proposals – Michigan, Minnesota, and Wisconsin. The percentages of FTE effort reflect total expenditure across the three subgrants.

Robert Meyer, the principal investigator, will supervise and coordinate this research project. He will coordinate collaborative cross-state research, oversee research on end-use data applications, and direct research activities conducted at WCER. He is budgeted at 40% time for all three years of the project.

Chris Thorn, will be the technology lead and will coordinate the collaborative cross state research on information systems and decision support tools. He is budgeted at 30% time for all three years of the project.

David Sleasman at 12% time will support partnership collaboration through the use of an enterprise-level web-based working environment (Vignette Business Collaboration Server).

Bob Glover at 50% time will support database architecture and decision-support research and development. He will coordinate requirements definition and development activities of the participating data system designers in the partnering states.

Contributions from various University of Wisconsin-Madison experts will be funded at 18% per year and will be drawn from a group of advising faculty members: Douglas Bates, Julie K. Underwood, Adam Gamoran, Daniel M. Bolt, Eric Camburn, & Richard Halverson.

Eileen Kellor will provide project management for the WCER-based team. She will also assist in coordinating partnership wide activities with team leaders at each state. This position is funded at 50% for all three years. A project coordinator will provide administrative support to project staff. This work includes tasks as well as transcription, coordination with research sites, and other research support duties. This position is funded at 50% for all three years.

One unnamed researcher is funded at 50% in years one and two and 40% in year three. This position is intended to allow the project team to purchase time from various technical experts currently working on other teams within WCER. Research staff included in this pool include: Anthony T. Milanowski, John Smithson, & Chris Fassnacht.

One graduate student at 50% time in year one, 45% in year two, and 40% in year 3 (supplemented by an additional graduate student at peak times) will provide support for data preparation, programming, and preparation of tables and charts.

**2. EMPLOYEE BENEFITS**

Fringe benefit rates vary by employee classification. Classifications and rates are established by the University. In recent years, fringe benefit rates have increased consistently on an annual basis and are increased slightly for each year following June 30.

Tuition Remission. Tuition remission costs are calculated at a rate of 25% of salaries paid to graduate assistants. These charges are in accordance with OMB Circular A-21, Section J.41, "Scholarships and Student Aid Costs," and Section A.2.c. "Purpose and Scope."

**3. TRAVEL**

All reimbursements for transportation, lodging, meals, and related costs are included in this category. Travel expense reimbursements are made on the basis of actual and reasonable expenditures. Payments are governed by Wisconsin State Statutes and the University of Wisconsin System Travel Regulations. Travel estimates are based on past Center accounting experience, allowable travel expenses based on the University and State of Wisconsin travel regulations and travel quotes from Madison travel agencies. An inflation rate of 4% is built into each succeeding year. The travel described below reflects total expenditure across the three subgrants.

Trips to each of the out of state partners (Michigan and Minnesota) are budgeted in year two. The budget includes 3 trips to DC to attend PI meetings or other coordinating events for the partnership each year. For the purpose of discussing the work and disseminating results, six trips to professional meetings are budgeted each year.

**5. SUPPLIES**

Supplies are budgeted for $20,205 in year one, $8,650 in year two, and $9,210 in year 3. In year one, we budgeted for 3 desktop computers, 2 laptops, a printer, software, and license fees for the web-based collaboration software. In year's two and three will be replacing existing computers for project staff. We will also be purchasing additional software packages as dictated by ongoing research needs.

**8. OTHER**

Conference and video/web conferencing includes potential external services that may need to be purchased from other units including consulting from data architects at our Division of Information Technology. It also includes support for web-based conferencing and for an annual working meeting for all Consortium members.

Computer Support. Computer support includes: access to a wide range of office productivity and analytical software; micro-computer hardware acquisition consultation and setup; installation and upgrading of software; end-user training; providing access and management on a local area network; troubleshooting of hardware and software; and technical assistance on a daily basis. This service is calculated at $2,274 per FTE based on past Center

accounting data. An inflation rate of 4% is built into each succeeding year.

e-Services. eServices offers an array of programming and creative services to researchers at WCER. Skilled personnel and advanced technologies are available to assist project with research-focused programming, web design, video, multimedia, and graphics. eServices support includes initial consulting with staff on web design, video data collection, application and database programming, graphics, server space, and access to equipment. This service is calculated at $1,703 per FTE based on past WCER accounting data. An inflation rate of 4% is built into each succeeding year.

**10. INDIRECT COSTS**

Modified Total Direct Cost (MTDC) is used as the base for overhead calculations. The MTDC base includes all direct charges except tuition remission. The University negotiates with DH&HS Region 5 to establish indirect cost rates. The rates used in this proposal are the approved rates effective July 1, 2000. The rates are:

WCER – The WCER indirect costs rate of 17% covers the following project support costs: administration of grants, contracts, subcontracts and agreements; budget consultation and preparation; programmatic accounting; financial reporting/monitoring; fiscal consultation; personnel services/activities; policy, procedure and regulation consultation; expenditure audit/review; facility management; equipment management; computer and multimedia support (not covered by direct costs); mail and shipment delivery; secretarial pool management; telephone installation, rental, and general usage; normal equipment service; normal editorial service; normal graphic service; office supplies; and miscellaneous program support. In addition, Center Management, University relations, and external relations with education and funding agencies are included.

University – The University indirect costs rate of 19% covers the following categories of cost: University general and administrative expense, sponsored projects administrative expense, University libraries expense, activity support expense, student administration and service, Dean's office expense, facility operation and maintenance, and building usage charge.

## Appendix A – Timeline

*State-Specific Project Phasing.*

There are two major dimensions in this work – coordination of tasks based on needs/expertise and appropriate phasing of design and development activities that reflect local data collection and reporting timelines. Table 1 describes the tasks idenfitied in the project according to identified areas of expertise and need across each of the partner states. Minnesota specific timelines are outlined in table 2.

**Table 1. Cross-State Collaboration and Task Responsibilities by State**

✓✓✓ = primary responsibility ✓✓ = secondary/shared responsibility ✓ = review and implementation

| *Task/Subtask* | *M ich.* | *M inn.* | *M isc.* | *W CER* |
|---|---|---|---|---|
| I. Data Analysis and Research Requirements | | | | |
| A. Value-added performance indicators | ✓ | ✓ | ✓ | ✓ ✓✓ |
| B. Evaluation of instructional practices and programs | ✓ | ✓ | ✓ ✓ | ✓ ✓✓ |
| C. Teacher education | ✓ | ✓ | ✓ ✓ | ✓ ✓✓ |
| D. Student and staff mobility | ✓ | ✓ | ✓ | ✓ ✓✓ |
| E. Tri-state coordination | ✓ | ✓ | ✓ | ✓ ✓✓ |
| II. Data Access Policies | | | | |
| A. Deadlines for reporting | ✓ ✓✓ | ✓ | ✓ | ✓ |
| B. Transactions vs. snapshot collection | ✓ ✓✓ | ✓ ✓ | ✓ | ✓ |
| C. Outreach to stakeholders | ✓ ✓ | ✓ | ✓ ✓ | ✓ |
| D. Who has access to what data? | ✓ ✓ | ✓ ✓✓ | ✓ ✓ | ✓ |
| E. Professional development | ✓ ✓✓ | ✓ | ✓ | ✓ |
| F. Tri-state coordination | ✓ | ✓ | ✓ | ✓ ✓✓ |
| III. Data Dictionary | | | | |
| A. Dictionary standards | ✓ | ✓ ✓✓ | ✓ | ✓ |
| B. Student course transcripts | ✓ | ✓ | ✓ | ✓ |

| Task/Subtask | M ich. | M inn. | M isc. | W CER |
|---|---|---|---|---|
| | | | ✓✓ | ✓✓ |
| C. Survey of instructional practices and educational programs | ✓ | ✓ | ✓ | ✓ ✓✓ ✓ |
| 1. Teachers | | | | |
| 2. Principals | | | | |
| 3. District staff | | | | |
| D. Outreach to stakeholders | ✓ | ✓ | ✓ | ✓ ✓ ✓ |
| E. Tri-state coordination | | ✓ | ✓ | ✓ ✓ ✓ ✓ |
| IV. Data Warehouse | | | | |
| A. Design | | ✓ | ✓ | ✓ ✓ ✓ |
| 1. Assessments | | | | |
| 2. Students | | | | |
| 3. Course transcripts | | | | |
| 4. Classroom inputs | | | | |
| 5. Teacher data | | | | |
| 6. School inputs | | | | |
| 7. Principal data | | | | |
| 8. District data | | | | |
| C. Data levels | | ✓ | ✓ | ✓ ✓ ✓ |
| 1. Raw data | ✓ | | | |
| 2. Data aggregates and composites | | | | |
| 3. Reports | | | | |
| D. Stakeholders Retrieval | | ✓ | ✓ | ✓ ✓ ✓ |
| 1. State education agency | ✓ | ✓ | ✓ | |
| 2. Districts | | | | |
| 1. Large urban | | | | |
| 2. Suburban | | | | |
| 3. Rural | | | | |
| 3. Schools | | | | |
| 1. Traditional | | | | |
| 2. Charter | | | | |
| 3. Other | | | | |
| 4. Teachers | | | | |
| 5. Parents and students | | | | |
| 6. Policy makers and public | | | | |
| E. Role based authentication and access | | ✓ ✓ | ✓ | ✓ ✓ ✓ |
| F. Integration and interoperability | ✓ | ✓ ✓ | ✓ ✓ | ✓ ✓ ✓ |
| G. Tri-state Coordination | | ✓ | ✓ | ✓ ✓ ✓ ✓ |
| V. Secure Data Transport | | | | |

| Task/Subtask | M ich. | M inn. | M isc. | W | W CER |
|---|---|---|---|---|---|
| A. Design | ✓ | ✓ ✓ | ✓ | ✓ | ✓ |
| B. Designs for rapid turn-around and non-duplication | ✓ | | ✓ | ✓ | ✓ |
| C. Federal, State, and local compliance reporting | ✓ | ✓ | ✓ | ✓ | ✓ |
| D. Data exchange (e.g., transcripts and test scores) across schools, districts, states | ✓ | ✓ ✓ | | ✓ | ✓ |
| E. Implementation | ✓ | ✓ | ✓ | ✓ | ✓ |
| F. Tri-state coordination | ✓ | | ✓ | ✓ | ✓ ✓ |

Table 2- Minnesota Milestones

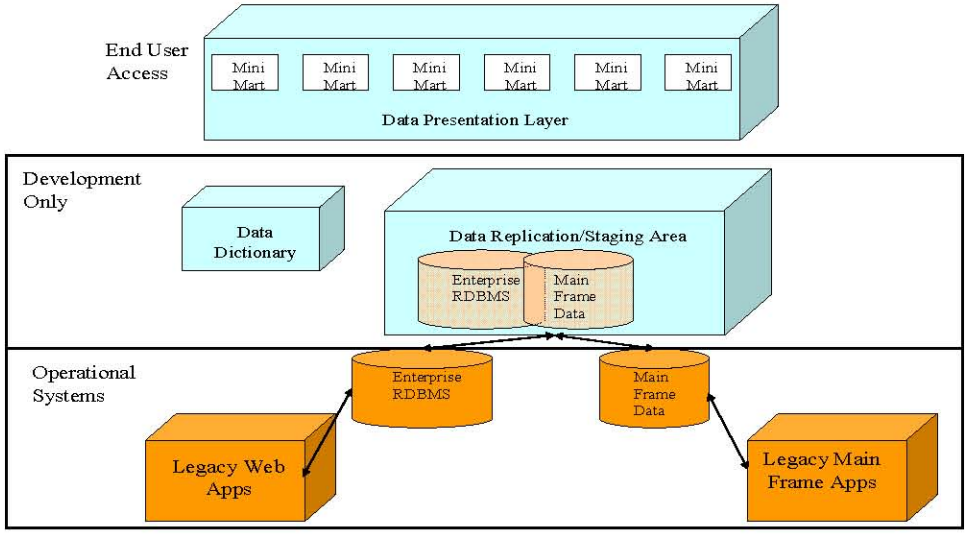
These are general milestones and will be refined upon award of grant funds and based on increased staffing availability

| Year | Quarter | Milestones |
|---|---|---|
| 2005 | Q4 | Select tools and purchase software |
| | | Complete internal IT staff training on new software |
| | | Complete preliminary organizational design for warehouse model |
| | | Identify warehouse pilot stakeholders |
| | | Collaborate with partner states on preliminary design of data dictionary |
| | | Collaborate with partner states on preliminary design of data warehouse |
| | | Convene district groups to review preliminary design of data warehouse |
| | | Complete business requirments for student ID repository |
| | | Assemble relevant state policies |
| | | Convene program area experts to consult on data dictionary |
| | | Identify MDE data stewards |
| | | Complete functional specifications for student ID repository |
| | | Collaborate with partner states on preliminary design of student ID repository |
| | | Convene district groups to review preliminary design student ID repository |
| | | |
| 2006 | Q1 | Purchase data dictionary software |
| | | Purchase portal software |
| | | Collaborate with partner states on functional specifications of data warehouse |
| | | Preliminary publication and tri-state review of business requirements for data warehouse |
| | | Preliminary publication of business requirements for initial phase of data portal |
| | | |
| | Q2 | Complete pilot for all data dictionary components |
| | | Complete data model for warehouse pilot |
| | | Develop training model for district staff on use of warehouse |
| | | Disciplinary Incident Data loaded into warehouse |
| | | Convene focus groups to identify teacher/classroom data elements |
| | | Preliminary publication and dissemination among tri-state partners of functional requirements for data warehouse |
| | | Preliminary publication and dissemination among tri-state partners of functional requirements for data portal |

| | | |
|---|---|---|
| | | |
| | Q3 | Pilot internal data warehouse with assessment and financial data |
| | | Convene tri-state groups to test internal data warehouse pilot |
| | | Convene district groups to test internal data warehouse pilot |
| | | Define common warehouse meta-data model |
| | | Use data warehouse to report AYP |
| | | Refine data model to include teacher data elements |
| | | |
| | Q4 | Test/ QC plan for student ID system |
| | | Complete student ID system complete |
| | | Identify data Access policy for teachers/districts |
| | | Define data analysis requirements for researchers |
| | | Eden data collection reported from warehouse |
| | | |
| 2007 | Q1 | Define secure data transport standards |
| | | Complete state data model |
| | | Convene tri-state group to review state data model |
| | | Convene district groups to review state data model |
| | | Define district level data transport issues |
| | | Purchase additional servers |
| | | Develop training models for teacher data analysis |
| | | Load teacher data into warehouse |
| | | Define survey data to be collected for school improvement activities |
| | | |
| | Q2 | Expand access to data warehouse/portal to district level staff |
| | | Define Value added computations for MN accountability |
| | | Expand data dictionary to include survey data elements |
| | | Preliminary publication and tri state desimination of functional requirements for value added computations |
| | | |
| | Q3 | Expand access to data portal warehouse to Teachers |
| | | Upgrade portal warehouse servers |
| | | Develop training modules for parents |
| | | |
| | Q4 | Add school improvement survey information to data portal warehouse |
| | | |
| 2008 | Q1 | Expand data access to portal for parents |
| | | Expand warehouse to include survey data |
| | | |
| | Q2 | Expand warehouse to include classroom data |
| | | |
| | Q3 | Complete State and federal data transport model |
| | | Automated Eden collection |

## Appendix B

### Figure 2. High Level Physical Architecture of Data Warehouse/Data Marts




**Initial Phase of Data Warehouse/Data Mart**

### Figure 3. Parallel Data Warehouse Structure with State, Regional, and District Warehouses

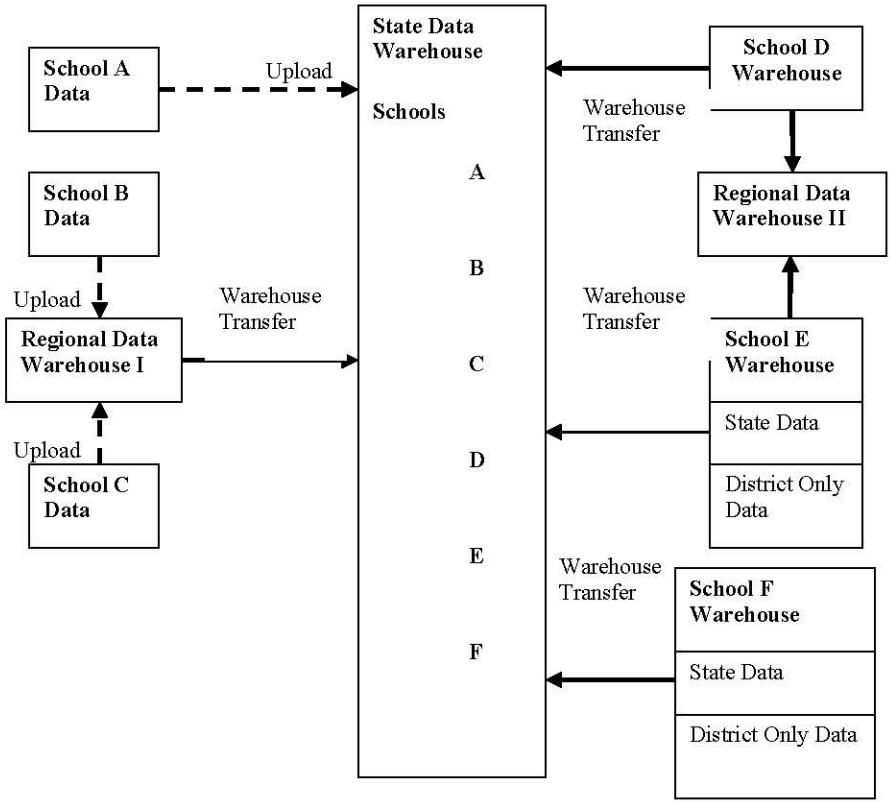
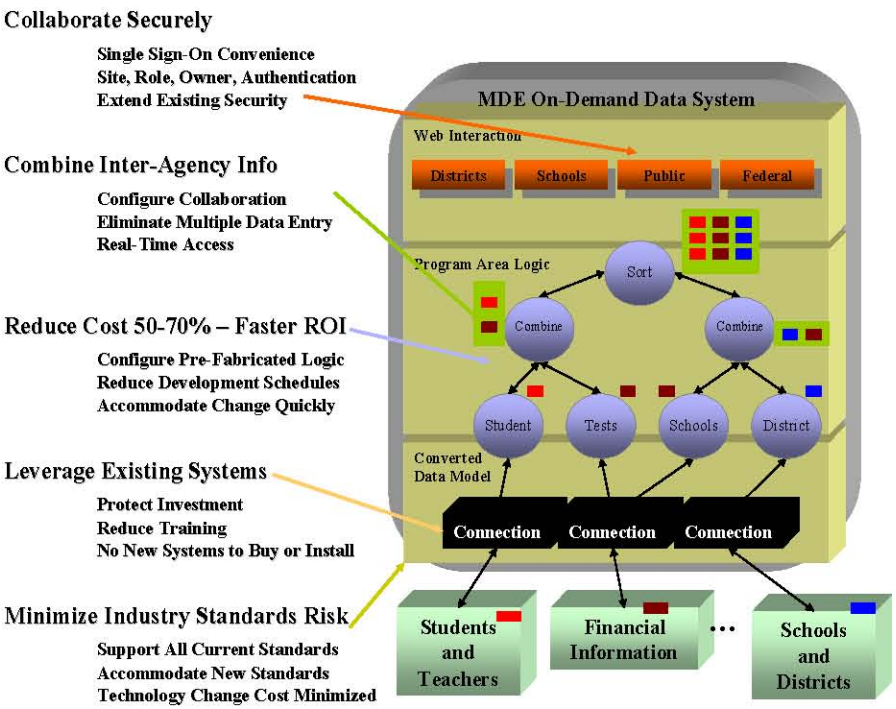


**Figure 4. Model-Driven Architecture (MDA)**




## A General Value-Added and Longitudinal Analysis Model

Value-added and longitudinal data analyses will be important end-use applications of the proposed longitudinal data system. This section presents a general value-added/longitudinal model, summarizes some of the important features of this model, and discusses the types of data bases (resident in the longitudinal data warehouse) needed to estimate the model. Extensive resources on these models and other data-analytic methods are availabel from WCER's Value-Added Research Center.

Box I presents the student level (subscript $i$) of a multi-level model with higher levels for classrooms ($j$), schools ($k$), districts ($l$), and possibly states. The definitions of the model parameters, data variables, and error components are contained in text boxes with arrows pointing to the appropriate model element. This basic model can be generalized to accommodate most, if not all, of the existing value-added and multi-level longitudinal models that are currently in use. (Different models make different assumptions about the degree to which student error components are correlated over time and whether the student, classroom, school, and district effects are fixed or random. Some models also exclude specific features of the model (e.g., demographic effects) or impose restrictions on some of the parameters ($\delta$ =1 in a linear growth model). Note that the model is sufficiently general that to allow for the possibility that students may be "enrolled" in a single classroom (typical at the elementary school level, but not always the case) or in multiple classes, for example, mathematics, science, English, language arts, and social studies. Similarly, the model allows for the possibility that students may attend more than one school during a school year. The classroom participation indicators in the model – the $I$

variables – are set to one if an individual is enrolled in a given class for an entire school year and set to a fraction to capture partial year enrollment.

**Box I. A Value-Added Model for a Given Subject, Grade, and Year**

$$Y_{2i} = \mu + \delta Y_{1i} + \kappa' X_i + \sum_{l(\text{district})} \sum_{k(\text{school})} \sum_{j(\text{class})} \left\{ \alpha_{jkl}^{\text{class}*} I_{Cijkl} + \beta_{kl}^{\text{school}*} I_{Sikl} + \chi_{l}^{\text{district}*} I_{Dil} \right\} +$$

Posttest

Pretest

Student Characteristics

True Total Classroom Effect

True Total School Effect

True Total District Effect

Stud. Error Term

Classroom Participation Indicator

School Participation Indicator

District Participation Indicator

One novel aspect of the above model is that we have specified the effects in the model as "true" effects so as to distinguish the effects that we would like to estimate – the true effects – from the effects that are identified; that is, the effects that can be estimated. This distinction is important in the value-added context because value-added effects are obtained as the residuals after controlling for observed data. Some of the major effects (also referred to as indicators) that can actually be estimated are contained in Box II.

**Box II. Value-Added Indicators Obtained From Value-Added Model**

**Total Classroom, School, and District Effect**

$$(\alpha\beta\chi)_{jkl}^{\text{class/school/district}} = \alpha_{jkl}^{\text{class}*} + \beta_{kl}^{\text{school}*} + \chi_{l}^{\text{district}*}$$

**Total School and District Effect**

$$(\beta\chi)_{kl}^{\text{school/district}} = \bar{\alpha}_{.kl}^{\text{class}*} + \beta_{kl}^{\text{school}*} + \chi_{l}^{\text{district}*}$$

**Relative Classroom Effect**

$$\alpha_{jkl}^{\text{class}} = (\alpha\beta\chi)_{jkl}^{\text{class/school/district}} - (\beta\chi)_{kl}^{\text{school/district}} = \alpha_{jkl}^{\text{class}*} - \bar{\alpha}_{.kl}^{\text{class}*}$$

Note that it is possible to estimate the combined effect of classroom, school and district effects (the sum of the residuals from all levels of the model, except for the student-level residuals – assumed to have an expected mean of zero at higher levels). Some analysts refer to this effect as a teacher effect, but it is clear that this effect absorbs the contributions of all educational levels. This effect can be aggregated to obtain a total school and district effect and these two effects can be differenced to obtain a relative classroom effect. Thus latter effect captures the effectiveness of classrooms in a school relative to the other classrooms in that

school. Which value-added effects are useful for policy makers and educational stakeholders is something that we will explore during the project.

**Box III. A Model to Evaluate the Effects of Classroom, School, and District Practices and Programs for a Given Subject, Grade, and Year**

**Classroom Level**

$$\alpha_{jkl}^{class*} = \sum_{m(teacher)} \left(\phi_1' T_m + u_{Tjklm}^{*}\right) I_{Tjklm} + \phi_2' C_{jkl} + w_{Cjkl}^{*}$$

- True Total Classroom Effect
- Effect of Measured Teacher Inputs
- Effect of Measured Classroom Inputs
- Measured Teacher Inputs
- Unmeasured Teacher Effects
- Measured Classroom Inputs
- Unmeasured Classroom Effects

**School Level**

$$\beta_{kl}^{school*} = \sum_{n(principal)} \left(\gamma_1' P_n + u_{Pkln}^{*}\right) I_{Pkln} + \gamma_2' S_{kl} + w_{Skl}^{*}$$

- True Total School Effect
- Effect of Measured Principal Inputs
- Effect of Measured School Inputs
- Measured Principal Inputs
- Unmeasured Principal Effects
- Measured School Inputs
- Unmeasured School Effects

**District Level**

$$\chi_l^{district*} = \eta' D_l + w_{Dl}^{*}$$

- True Total District Effect
- Effect of Measured District Inputs
- Measured District Inputs
- Unmeasured District Effects

Box III contains the additional three levels of the multi-level model. These equations extend the model from one that is limited to classroom, school, and districts effects to a model that incorporates educational inputs at each level (instructional practices, leadership strategies, policies, programs, etc.). The model system as a whole can be used to estimate value-added indicators (as discussed above) and to estimate the effects of educational programs and other inputs. Thus, a single model can be used for educational accountability purposes and to evaluate program effectiveness. One of the end-use applications that we will explore is combining both of these tasks so that it is possible to provide direct guidance to educators about available program options that will improve the performance of classrooms and schools. This is an exciting extension of the value-added tool box, an application that we refer to as "diagnostic value-added analysis."

An important feature of the classroom/class and school equations is that they have been designed to allow for the reality that teachers may teach multiple sections in a given year (for example, three sections of Algebra 1, 2 sections of geometry, and perhaps even a course in a different subject area) and that teachers and principals may be assigned to different schools and classes during given school years and in different school years. Thus, one of the strengths of the model is that it allows for the reality of student, teacher, and principal mobility over time.

As discussed in the proposal, an inportance motivation for studying end-use applications is to "derive" data warehouse and dictionary specifications that are needed to support the application. We present a succinct summary of these data needs in Box IV. Note that we distinguish data elements are serve as unit identifiers (the class of $I$ variables) and educational inputs (variables $X$, $C$, $T$, $P$, $S$, and $D$).

**Box IV. Data Bases Required to Support High-Level Longitudinal and Other Analyses**

| Data Base | Unit Identifier | Linked Identifiers / Examples of Educational Inputs | Statistical Variables |
|---|---|---|---|
| Student assessments and other outcomes (by subject, grade, and year) | Student ID [i] | Test scores<br>Student attendance (aggregate)<br>Disciplinary events | $Y_{it}$ |
| Student characteristics | Student ID [i] | Demographic characteristics | $X_{it}$ |
| Student Course Transcripts | Student ID [i] | Course/class ID [(jkl)] | $I_{Ci(jkl)t}$ |
| | | Course grade, credits | |
| | | Enrollment dates (begin, end) | |
| | | Attendance (by course) | |
| Course/class | Course ID [(jkl)t] | Teacher ID [m] | $I_{T(jkl)mt}$ |
| | | Principal ID [n] | $I_{P(jkl)nt}$ |
| | | School [k] | |
| | | District [l] | |
| | | Course inputs: | $C_{(jkl)t}$ |

| | | | |
|---|---|---|---|
| | | Class size<br>Instructional practices<br>Facilities and resources<br>Test preparation activities | |
| Teacher | Teacher ID [m] | Teacher inputs:<br>Teacher characteristics<br>Education and training<br>Employment history<br>Test scores (prior to and after teacher education and training) | $T_{mt}$ |
| Principal | Principal ID [n] | Principal inputs (similar to teacher inputs):<br>Leadership practices | $P_{nt}$ |
| School | School ID [kl] | School inputs:<br>Professional development<br>Teacher autonomy vs. collaboration | $S_{klt}$ |
| District | District ID [l] | District inputs:<br>Financial resources<br>District/school control over school budget and staff hiring | $D_l$ |

**Table 2. MDE Staff**

| *MDE Personnel* | *Responsibility* |
|---|---|
| MDE Cabinet | **Alice Seagren**, Commissioner. **Chas Anderson**, Deputy Commissioner. **Pat Olson** Assistant Commissioner of Accountability and Improvement. This project has cabinet level support and will be coordinated with other P-16 initiatives within the department. |
| Project Director | **Cathy Wagner,** Information Technologies Director will lead the policy coordination and implementation efforts across the agency and among districts in the state. She will be personally involved with this project on a regular basis to oversee the organizational both within the agency and across districts.<br><br>**John Paulson**, Software Systems Manager. John will lead in driving the quality data warehouse effort forward. He will serve as the ultimate authority for technical issues regarding data warehouse planning and implementation strategies, as well as collaboration with all parties collaboratively involved in deliverables. |

| | |
|---|---|
| Project Manager | **Craig Rhombs** is an experienced IT project manager who will over see the coordination of daily activities and schedules across developers and program area staff. Craig will work closely with John to monitor implementation progress. |
| IT Technical Leads | **Brian Hecht,** Application Systems Architect will provide overall technical direction and coordination for the development of the data warehouse and security framework.. **Dan McCreary**, Data Architect will provide overall technical direction and coordination for the development of the data dictionary and data model. **Liangsheng Chang** is a experienced software developer who has developed many educational applications for MDE. He will be the lead software developer on the team. |
| Other IT Staff | **MDE plans on adding 4 development staff and one business analyst** to assist with the implementation of this project |
| District Liaisons | **Patrick Plant** from Anoka Hennepin School district will serve as principal consultant for end use cases and interoperability issues concerning data transport between the state and districts and among districts. He will work with selected school districts chosen as statewide representatives to test and pilot the end-product for functionality, ease of use, and appropriateness to local needs |
| Data Custodians | Subject area experts in various disciplines will assist with this project in the role of data stewards**.**<br><br>**Pat Olson,** Assistant Commissioner for Accountability and Improvement she will oversee the creation of the data dictionaries and data use policies for the major data sets to be included in the warehouse.<br><br>**Tim Vansickle**, Director of Statewide Assessments he will work to ensure that the data warehouse will support the rigors of value added analysis planned by the Testing and Assessment Division.<br><br>**Jessie Montano**, Director of NCLB Programs she will ensure that the data warehouse meets the needs of activities and requirements associated with Title I AYP and School Improvement initiatives.<br><br>**Heather Brit,** coordinator for the Title IV Disciplinary Incidents activities across the department, she will oversee the inclusion of disciplinary incident data into the warehouse and work to coordinate efforts from this grant with a Title IV data systems grant recently awarded to MDE |
| End Users | Provide input from the user prospective to establish, monitor, and adjust expectations. Initially, this will included data teams at MDE, but will be expanded to larger stakeholder groups |

| | |
|---|---|
| Vendor(s) | The architecture will strive to be vendor neutral. Eventually, MDE will evaluate vendors and select among them according to appropriate fit to the tri-state consortium's goals, but current vendors will be involved to some degree in this project. |

**Resumes Available in Resume Section of Application*

**Table 3. WCER Staff**

| Person | Title | Areas of Expertise |
|---|---|---|
| **Management Team** | | |
| Robert H. Meyer, Principal Investigator | Director, Value-Added Research Center | Value-added and longitudinal models; statistical program evaluation models; education policy; transcript standards |
| Chris Thorn | Director of Technical Services | Decision support systems; mixed qualitative and quantitative methods; large-scale program evaluation |
| Eileen Kellor | Project Manager | Human resources and labor relations; project and conference management |
| To be named | Project Coordinator | Project and web administration |
| **Information Technology and Statistical Computing Team** | | |
| Douglas Bates | Professor, Department of Statistics | Statistical computing with large datasets; nonlinear mixed effects models; core contributor to R language for statistical computing |
| Chris Fassnacht | Director of e-Services, WCER | Engineering and programming; web-based applications; digital media |
| Robert Glover | Database Applications Architect, WCER | Applications developer for enterprise-scale, complex database systems |
| David Sleasman | Webmaster, WCER | Knowledge manager; web designer |
| To be named | Graduate Project Assistant | Programming; database management |
| **Research and Applications Team** | | |
| Julie K. Underwood | Dean of the School of Education | School law; state and national educational policy; teacher education |
| Adam Gamoran | Director of WCER and Professor, Department of Sociology | Sociology of education and organizational analysis; multi-level statistical analysis; program evaluation |
| Daniel M. Bolt | Associate Professor, Department of Educational Psychology | Psychometrics and latent variable modeling; item response theory |
| Eric Camburn | Assistant Professor, Educational Leadership and Policy Analysis | Statistical and measurement models; large scale studies of education |
| H. Gary Cook | Embedded Research Manager, Milwaukee Public Schools, and Assistant Scientist, WCER | Data-driven decision-making in schools and districts; test theory; federal and state education policy |

| Person | Title | Areas of Expertise |
|---|---|---|
| Richard Halverson | Assistant Professor, Educational Leadership and Policy Analysis | Data-driven instructional systems; educational leadership; learning sciences |
| Allen Long | Graduate Project Assistant | Econometrics; economics of education |
| Anthony T. Milanowski | Assistant Scientist, WCER | Human resource management; standards-based teacher evaluation |
| John Smithson | Research Associate, WCER | Developer of Surveys of Enacted Curriculum; web-based data collection |
| To be named | Researcher, WCER | Data analysis models and software |

**Table 4. Project Recommendations by CCSSO/DSAC**

| Project No. | Project Name | Project Description |
|---|---|---|
| Project 2 | Develop a project management process | The project management process is a proven set of tools and procedures for successfully managing a number of large projects simultaneously. |
| Project 3 | Develop a Strategic Technology Plan | The plan will allow MDE to establish systems, program and staffing priorities to address the strategic agenda of the next five years and bring systems up to speed.. |
| Project 5 | Data Reporting and Analysis Platform | Construct a user-friendly tool set for self-directed data selection, analysis, and presentation by end users. The resulting service will allow stakeholders to select and analyze subsets of state data based upon their respective roles and permissions, and to produce standard and ad hoc reports as needed. |
| Project 3 | Develop a data warehouse and analysis system | This project will first build a governance structure that defines the role of data owner and establishes policies and guidelines for collecting and releasing data. It will then develop the requirements and specifications for a data warehouse to retain historical data on student demographics, teachers, financial allocations, assessment and program data that can be used to fundamentally drive student performance assessment decisions at the classroom and student level. |
| Project 8 | Directory | This project will build a directory residing on a relational data base that maintains core information such as e-mail address, password information, work address, phone number, school/district etc. for school organizations that require personalized access to state online applications. |

Letters of Support

We are pleased to submit a letter of support for this tri-state project from the Minnesota Department of Education Deputy Commissioner Chas Anderson as well as four letters of support from out side agencies. The following organizations will be working primarily with the Minnesota component of this project but are willing to extend their commitment of support to all of the partners states associated with thie project:

- Larry Furth, Executive Director Schools Interoperability Framework Association

- Dr. Rick Spicuzza, Moundsview Assessment Coordinator on behalf of the Minnesota Assessment Group a consortium of greater metro area school district assessment directors

- Dr. Roger Giroux, Superintendent of Anoka- Hennepin School District, second largest school district in Minnesota and early implementor of SIF standards

- Jeffery Ott, Director of State and Local Government Educational Services for Cognos

Minnesota Department of Education

June 30, 2005

Dear Dr. Kubezdela :

I am pleased to express support on behalf of the Minnesota Department of Education and the Pawlenty administration for the multi-collaborative proposal to build a longitudinal data system as the foundation for data-driven decision-making in the PK-12 educational system and the larger PK-16+ system. By constructing a method to track student outcomes and educational experiences, the project will make it possible for Minnesota schools and teachers to position themselves at the cutting edge of innovative educational practices.

This project is a crucial part of the larger effort to improve the quality of data used in accountability systems for Minnesota schools. These efforts will make it possible to provide value-added information that generates and focuses attention on information relevant to teaching and learning to improve education for all.

The proposal is collaboration involving Minnesota, Michigan, Wisconsin and the Wisconsin Center for Educational Research at the University of Wisconsin and we intend to work cooperatively with other states in the development of national data dictionary and warehouse standards. This is important because the current data burden experienced by schools in Minnesota can be relieved through leadership at the state level in the design and implementation of open architecture frameworks that based on interoperable data structures. This proposal is a vital step in the process of building a larger PK-16+ data system that will enable PK-12 and higher education to work together to provide high-quality educational experiences for all students.

Sincerely,

Chas Anderson
Deputy Commissioner

June 25, 2005

SCHOOLS INTEROPERABILITY FRAMEWORK

Institute for Educational Sciences,

This letter is being written in support of the Statewide Longitudinal Data System Program grant submission for the states of Minnesota, Michigan and Wisconsin. The Schools Interoperability Framework Association (SIFA) feels that this member grant submission supports the goal of the IES grant program to "... enable agencies to design, develop, and implement statewide longitudinal data systems to efficiently and accurately manage, analyze, disaggregate, and use individual student data, consistent with the Elementary and Secondary Education Act of 1965".

The SIF Association's vision is that schools will be enabled to better utilize data by implementing technology in a manner that leverages the promise and capabilities of interoperability between disparate applications. The Association is a unique non-profit collaboration of over 300 schools, districts, states, the U.S. Department of Education, software vendors and consultants collectively defining the rules and regulations for educational software data interoperability. SIFA enables diverse applications to interact and share data efficiently, reliably and securely regardless of the platform hosting the applications allowing for local "best of breed" approaches. It has united these education technology end users and providers in an unprecedented effort to give teachers more time to do what they do best: teach.

This proposal is focused on the real need to address data interoperability in the construction of statewide systems to enable the measurement of educational success of ALL students, teachers, and schools in each of the partner states and serve as a useful implementation model for others. As outlined in the USED release of the National Educational Technology Plan, *Toward A New Golden Age In American Education*, "Integrated, interoperable data systems are the key to better allocation of resources, greater management efficiency, and online and technology-based assessments of student performance that empower educators to transform teaching and personalize instruction". We feel this proposal supports the identified need for data interoperability and access for all stakeholders to better the "system" of education.

The SIF Association requests that the Institute for Educational Sciences give this grant submission the highest consideration for funding and implementation.

Larry L. Fruth II, PhD
Executive Director
Schools Interoperability Framework Association

*1090 Vermont NW 6th Floor* *Washington, DC 2005* *(202) 789-4460*

COGNOS®

Cognos Corporation
15 Wayside Drive
Burlington, MA 01803

June 29, 2005

Minnesota Department of Education
1500 Highway 36 West
Roseville, MN 55113-4266

Dear Sir or Madam:

Cognos is the performance management platform of choice among U.S. K-12 organizations, many of whom use Cognos to fulfill the reporting and program management requirements set out by the *No Child Left Behind (NCLB)* Act, a law enacted in 2002 to bring greater accountability and flexibility to federal education programs. To date, Cognos can be found in over 530 K-12 school districts, 13 State Departments of Education, and the U.S. Federal Department of Education. The Cognos solution empowers over 20,000 schools to deliver optimal education programs and improve student performance for over 12 million American children and young adults.

Cognos is committed to a variety of data warehouse meta-data interoperability standards to promote NCLB initiatives. Our tools currently support a variety of XML and CWM standards for the import and export of data warehouse metadata. In addition, our Cognos K-12 Education Performance Management System (EPMS) reporting templates and data warehouse incorporate these open standards in a commercial off-the-shelf (COTS) product available for our Education partners. We understand that in order for researchers to perform longitudinal data analysis that standards are essential.

We feel that a consortium of states lead by the Minnesota Department of Education's metadata standard efforts could produce a new comprehensive set of data warehouse standards, ranging from data dictionary definitions up to web service standards to promote research-enabling portal end-use applications. The Cognos products already are leaders in providing advanced federated database search capabilities. But we are also aware that the development of additional K-12 education specific data standards are critical for the widespread adoption of data warehouse technology and data-driven based decision making. These additional standards will promote policy-aware web services that allow educational stakeholders to gain unfettered access to national assessment data.

Cognos' has currently-supported products that comply with these standards. These products leverage vendor-neutral open standards that are built-upon and consistent with the features of the Minnesota-lead educational collaboration.

Sincerely,

Jeffrey J. Ott

Jeffrey J. Ott
Director
State & Local Government/Education, Services

JUN-30-2005 11:37 MOUNDS VIEW ISD 621 651 639 6204 P.01/01

Mounds View
PUBLIC SCHOOLS

Rick Spicuzza, Ph. D.
Coordinator of Assessment/Evaluation

June 30, 2005

Chas Anderson, Deputy Commissioner
Minnesota Department of Education
1500 West Highway 36
Roseville, MN 55113

Dear Chas:

I am very pleased to express support for your proposal to build a longitudinal data system as the foundation for data-driven decision-making in the PK-12 educational system and the larger PK-16+ system. Providing a consistent and common method to track student academic outcomes will enable districts throughout the state to better evaluate and address student learning and meet the diversity among our students. As a district committed to DDDM we value your efforts and the project you have outlined will make it possible for Minnesota schools and teachers to position themselves at the cutting edge of innovative educational practices.

This project is a crucial part of the larger effort to improve the quality of data used in accountabilty sytems for Minnesota schools. Your efforts will make it possible to provide value-added information that generates and focuses attention on information relevant to teaching and learning to improve education for all.

The multi-state collaboration involving Minnesota Department of Education, Michigan, Wisconsin and the Wisconsin Center for Educational Research at the University of Wisconsin is very welcomed and draws upon an expert base of states and Univeristies committed to measuring student growth and value-added methodology. Further, the collaboration among states in the development of national data dictionary and warehouse standards will surely advance our understanding of district and student needs and improve education evaluation. This is important because the current data burden experienced by schools in Minnesota can be relieved through leadership at the state level in the design and implementation of open architecture frameworks that based on interoperable data structures. A state data model for education created with input from the education community will ensure that Minnesota has state of the art systems information systems that serve the citizens of the state.

I am pleased that you are undertaking this project. I believe it is a vital step in the process of building a larger PK-16+ data system that will enable PK-12 and higher education to work together to provide high-quality educational experiences for all students. Best wishes and we look forward to collaborating on the project should it be funded.

Sincerely,

Richard J. Spicuzza, Ph.D.
Mounds View Public School
Coordinator of Assessment and Evaluation
Member of the Minnesota Assessment Group

2959 Hamline Avenue N. • Roseville, MN 55113-1664 • 651-639-6017 phone • 651-639-6204 fax • www.moundsviewschools.org
TOTAL P.01

SCHOOLS INTEROPERABILITY FRAMEWORK

June 25, 2005

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Larry L. Fruth II, PhD
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*1090 Vermont NW 6th Floor* *Washington, DC 2005* *(202) 789-4460*

Roger M. Giroux
Superintendent

RMG:pjg

*Partners in educating all learners for a successful future in an ever-changing world.*